

Founded in 1832

# RAILWAY LOCOMOTIVES AND CARS

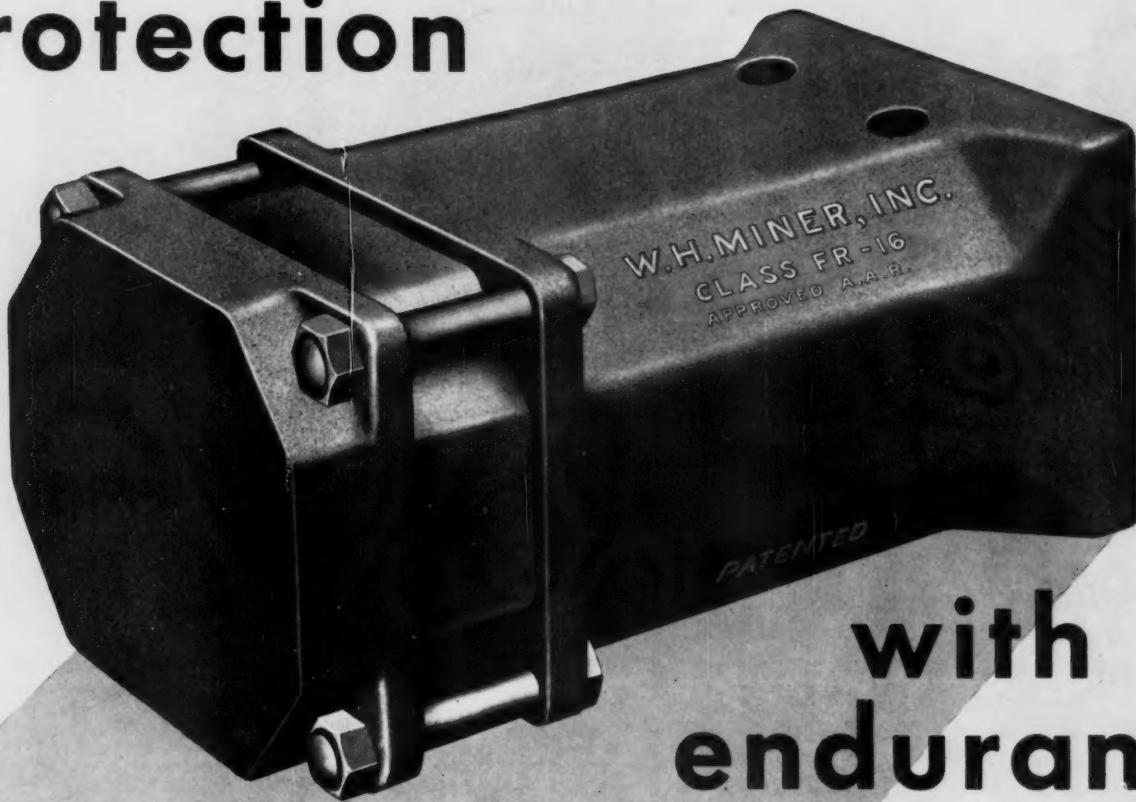
MARCH 1957

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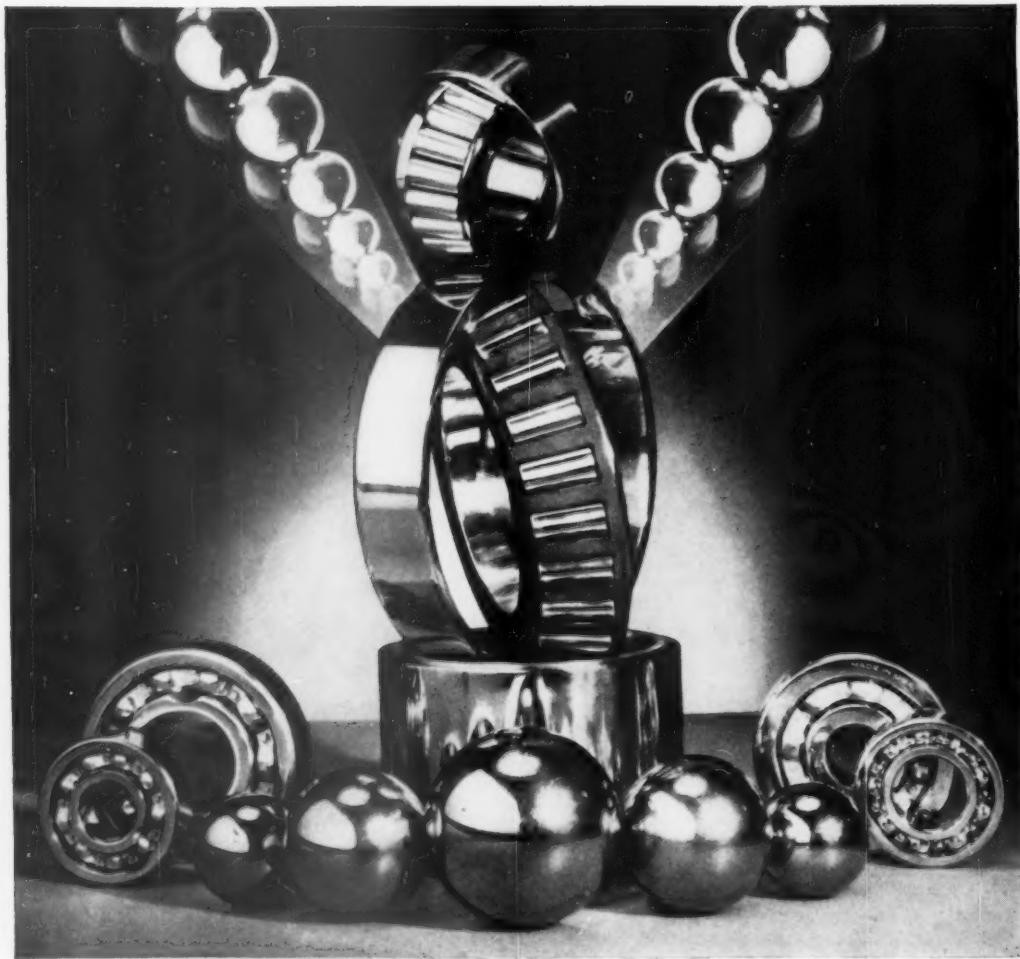
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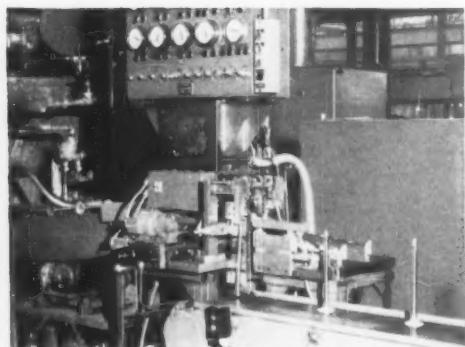
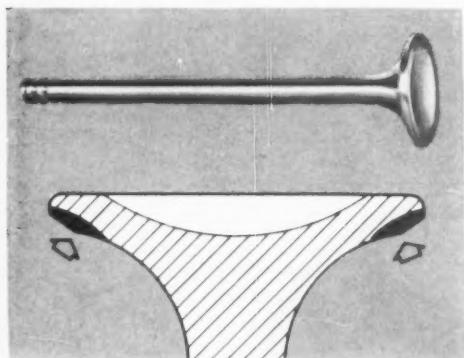
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DIVISION OF THE WICKES CORPORATION • SAGINAW 13, MICHIGAN

*Electro-Motive Parts Progress*

# THIS EXHAUST VALVE AVERAGES TWO YEARS SERVICE BEFORE REGRIND



Continuing improvement is an unending program at Electro-Motive to bring you products of highest quality at lowest cost. When you buy General Motors Diesel parts you get components that are

## Reasons:

### **1** *Engine's choice*

Experience has taught us that an engine dictates its own valve needs. Our Model 567 Diesel proved this when previous valve designs of other engines were tried. Exhaustive testing produced the valve shown here, which in normal passenger or freight service runs two years before seat and face regrind. Cutaway view shows special hard Stellite face on valves dictated by our higher horsepower 567C Diesel.

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designed, engineered and built to work together. In addition, you benefit with a full warranty and convenient, fast delivery from nine strategically located Electro-Motive warehouses.



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# RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as  
the American Rail-Road Journal

MARCH, 1957

VOLUME 131, No. 3

## MOTIVE POWER AND CAR

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## NEXT MONTH:

Roll Them Out Like New:  
(Second Installment)  
Dismantling and Shipping



### Sleeve-Type Journal Bearing

The Kar-Go, a sealed sleeve-type axle bearing, has been developed for freight cars. It consists of a hardened axle sleeve, an aluminum alloy bearing, and a felt wick lubricator assembly, all contained in a housing that fits into the standard journal box with minor alterations, or into narrow or wide-jawed pedestal-type truck side frames. Entrance of foreign material and loss of lubricating oil are virtually eliminated because all the parts within the unit are sealed.

Kar-Go bearing has been successfully tested by 10 American and Canadian railroads which have now accumulated more than five million unit miles. Eighteen more are ready to start test programs. Pilot production is now underway to fill these service test orders. Kar-Go bearing development began in 1952. In 1955 the new bearing successfully completed initial laboratory testing.

It has an automotive-type oil seal constructed of synthetic rubber. The unit holds only one pint of oil which, according to extensive tests, is enough to properly lubricate it. Spring-loaded felt wick lubricators are fixed at the bottom of the bearing unit and maintain positive contact with the journal sleeve which fits over the axle.

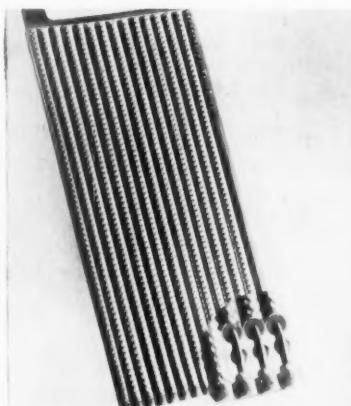
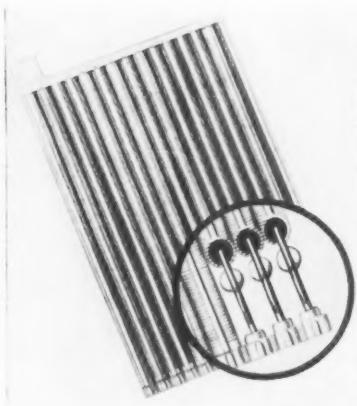
The precision design and accurate control of the clearance are said to increase bearing load capacity and cooling. Bearings are available for journals from 5x9 in. to 6½x12 in. *Allison Division, Dept. RLC, General Motors Corp., Indianapolis.*



### Box Car Liner

Conolite, a laminate of polyester resin and glass cloth has been developed to protect box-car walls from wear and impact, eliminate dust, and to seal off existing dirt traps.

This lining is described as a glossy, non-porous surface, preventing staining and penetration by oils, solvents or organic materials. It is said to be easily cleaned, retaining no odors, and needs no special skill or preparation to apply. *Continental Can Co., Conolite Div., Dept. RLC, 205 W. 14 st., Wilmington 99, Del.*



### Battery Capacities Increased 20 Per Cent

A new type of Exide-Ironclad positive plate for lead storage batteries has resulted in a battery of increased capacity in a given space. It will apparently also extend battery life. In the new positive plate, the slotted tubes which retain the active material in contact with the central Silvium grid spines are replaced with a new type of retainer. The new retainer consists of a perforated polyethylene tube inside of which there is a second tube of woven glass fiber. The two tubes allow for free passage of electrolyte and also

per cent, and watt-hr capacity 21 per cent without increasing the external battery dimensions. At the one-hr rate, watt-hr capacity has been increased 35 per cent. Conversely battery size may be reduced without reduction of capacity. Weight is up 6 per cent for batteries of equal size and 20 per cent more capacity.

Because of these characteristics, the battery is designated as a motive power battery Type TG Exide-Ironclad Giant for the operation of industrial trucks. It has a rated capacity of 72 amp-hr per positive plate as compared with 50 amp-hr for the type TLM and 60 amp-hr for the TH type. *Exide Industrial Division, The Electric Storage Battery Company, Dept. RLC, Box 8109, Philadelphia 1, Pa.*

retain active material firmly in place. The combined thickness of the plastic and woven glass tubes is less than that of the slotted tube and allows for an increase of active material in a tube having the same outside diameter. Also, since the material is better contained, it has been possible to reduce sediment space and increase plate length accordingly. Space above the plates has not been changed.

As a result, battery amp-hr capacity, at the 6-hr rate, has been increased 20

### Compressed Air Filter

A combined unit for the automatic filtration, regulation and lubrication of air supply to pneumatically operated equipment is available in  $\frac{1}{4}$ ,  $\frac{3}{8}$  and  $\frac{1}{2}$ -in. sizes.

"Tornado" action, which imparts a downward spiral motion to the incoming air, throws foreign particles and condensation against the sides of the filter bowl for accumulation and drain-off. Cleaned of larger particles and condensation, the air then passes through the passages of the bronze filter element for final

# Now! Four complete lines!

# Thor right angle air tools

## Capacity range—No. 12 to $\frac{3}{4}$ " nuts

NEW NO. 4 SERIES SPECIALLY  
DESIGNED FOR HEAVY DUTY



### LIGHT DUTY WORK

Lightweight Thor No. 2 series right angle air nut setter makes this assembly job quick, sure and easy on the operator. No. 2 series includes tools up to  $\frac{1}{4}$ " capacity—and is available with an offset or lever throttle. Also a wide range of accessories.



### CLOSE-QUARTER WORK

Getting at those hard-to-work areas is no problem for this Thor right angle nut setter. This tool is from the Thor No. 3 series which includes nut setters up to  $\frac{5}{16}$ " capacity. All Thor nut setters and screwdrivers have built-in air regulators.

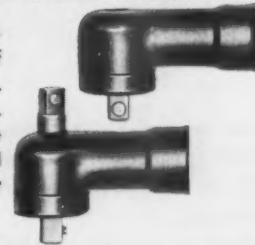


### HEAVY DUTY WORK

Thor's newest entry in the direct drive right angle air tool field is the No. 4 heavy duty series. All new, the No. 4 series offers extra power, light weight and long trouble-free life.

### All Thor right angle nut setters available in single or double end attachments

You can apply nuts or remove them with any of the tools in the Thor No. 2, 3, 4, and 5 series. Equipped with double end attachments, one end applies nuts—the other removes them.



Thor's flexibility goes even further. All four right angle tool series, in single and double end, offer a heavy duty attachment and a close-quarter attachment—plus a complete range of speeds in all sizes and types. Thor has right angle air tools which can be adapted to most any application involving threaded fasteners. Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill.

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# In tank car cleaning, too

Oakite gives you  
**low-cost end results**



Using the *correct* cleaning *method* is just as important as using the *correct* cleaning *compound* when it comes to cutting maintenance *cleaning costs*. Take these typical examples:

One railroad had to spend over \$5200 to clean 135 tank cars manually (not to mention the hard work involved). But when they mechanized the job with the Oakite 324 Cleaning Unit, they got black and white proof of better results. The method eliminated laborious scrubbing, hastened turnaround, cut consumption of materials by two-thirds, saved \$1600.

The Oakite Fogging Unit is another such improver of end-results. Applying an efficient mist of Oakite soil-loosening detergents, it has done an "impossible" *rush job* of cleaning out a tallow encrusted car in only 6 hours... the *thorough* removal of asphaltic deposits in just 5 hours.

It's *end-results* that count most on the cost sheet. And that's why so many leading roads count on Oakite materials, methods and equipment for low-cost cleaning. Booklet F-8055 describes these in detail. Write Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.



*gives you the important advantage...*

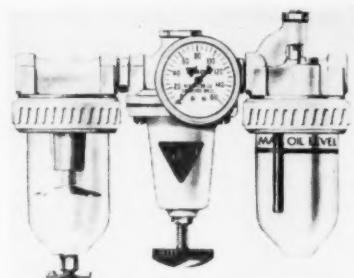
**LOW-COST END RESULTS**

Export Division Cable Address: Oakite

**RAILROAD DIVISION**

## EQUIPMENT

(Continued from page 6)



filtering before entering the regulator. Screwed-ring design permits removal of filter bowl without the use of tools.

The unit also features an "aspirator." This allows instant compensation of the reduced pressure under conditions of sudden, or widely varying flow demands.

Lubricator portion is designed with a high-velocity venturi action to provide vaporization and assimilation of the metered oil. Reported exclusive, an internal by-pass which parallels the venturi provides practically a uniform pressure drop, even under widely fluctuating flow conditions. Lubricator also has hand-tight instant removal features. *Watts Regulator Co., Industrial Div., Dept. RLC, Lawrence, Mass.*



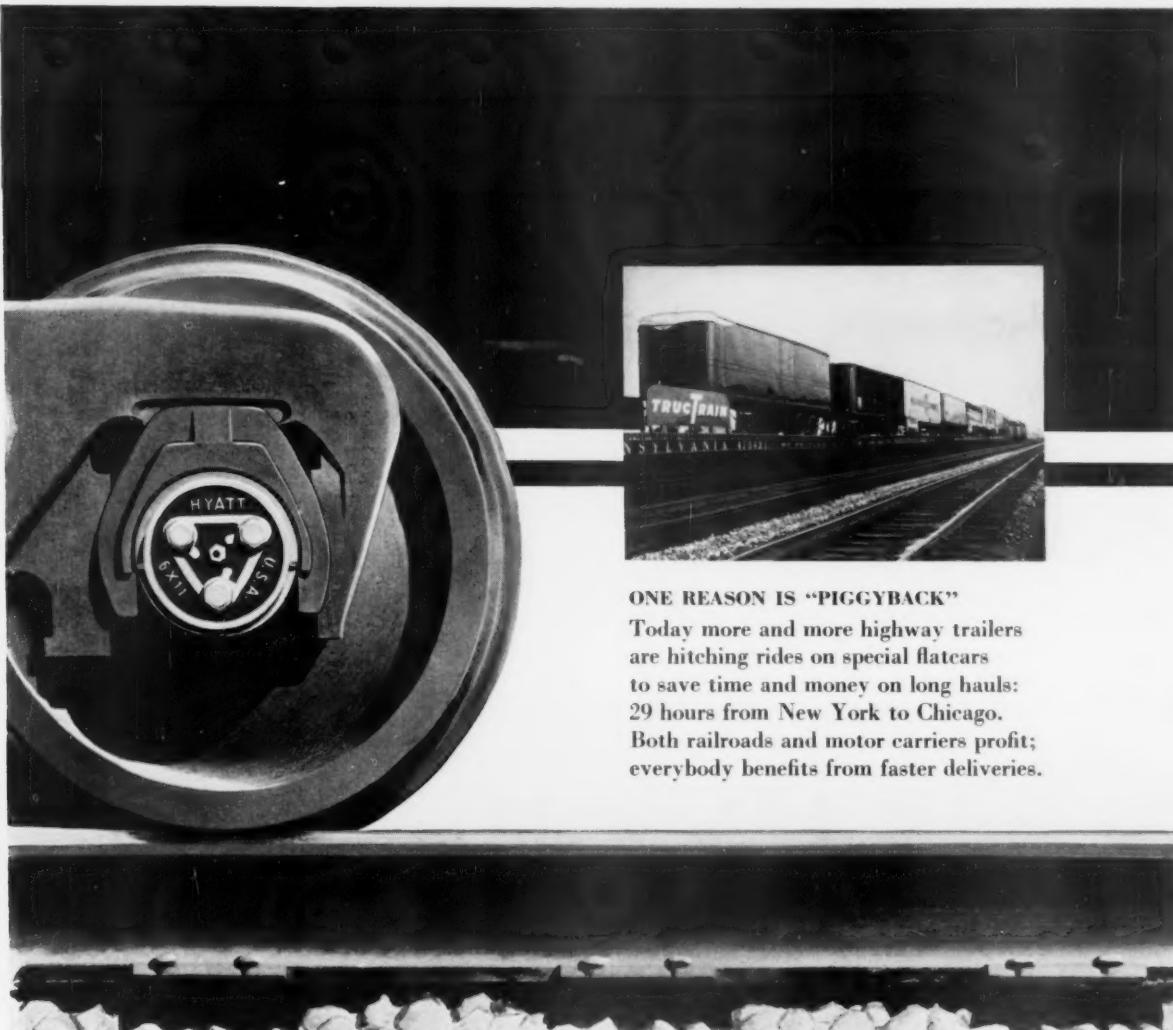
### Self-Activated Marker Light

Commercial high brightness safety signals and markers utilizing radioactive Krypton 85 have just been announced. The signals and markers which are designed for installations where power and maintenance are limited, employ treated phosphor crystals excited to luminescence by Kr 85. Units are available in a variety of shapes, sizes and brightnesses.

In clear weather, the lights are readily visible at distances in excess of 500 yards. Colors available include blue, green, yellow, pale orange and orange-red.

Sources are enclosed in hermetically-

# Why rail freight is going great!



## ONE REASON IS "PIGGYBACK"

Today more and more highway trailers are hitching rides on special flatcars to save time and money on long hauls: 29 hours from New York to Chicago. Both railroads and motor carriers profit; everybody benefits from faster deliveries.

Another   
contribution  
to railroad  
progress



**HYATT Hy-ROLL BEARINGS**  
FOR NON-STOP FREIGHT

ONE MORE BIG REASON IS HYATT HY-ROLL BEARINGS for non-stop freight. It's significant that so many of the new flatcars built for high-speed "piggyback" service have HYATTS . . . because railroads recognize roller bearings are the answer where delay-free dependability counts! HYATT Hy-Rolls banish hotboxes, major cause of freight train delays. Their sealed-in 3-year grease supply saves time-wasting waits for inspection and lubrication, too. And new HYATT Hy-Rolls are so simple to install and maintain that they make the big switch to roller bearings practical at last. They're playing a bigger and bigger part in the railroads' modernization program to bring America *better and better freight service!* Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.

Watch "WIDE WIDE WORLD" Sundays on NBC-TV

BUT HOW WILL  
THEY TREAT  
THE COM-  
MUTATOR?



**the man on the left  
is R-I-G-H-T!**

Any way you look at diesel-electric brushes this conclusion must invariably be reached . . .

*The best, most economical grades for any given equipment are those that keep the commutators in the best condition under all operating conditions and over the longest mileage schedules.*

Brush life is important, too . . . but, in the Stackpole "book", commutators and commutation come first . . . and for primary economic reasons.

Motor brushes, for instance, cost only about \$12 a set.

Conservatively estimated, reconditioning a motor commutator costs around \$400 . . . and perhaps more if it has been badly bar burned by brushes that had only long life to recommend them.



## STACKPOLE

### Diesel Electric BRUSHES

**STACKPOLE CARBON COMPANY, ST. MARYS, PA.**

BRUSHES for all rotating electrical equipment • ELECTRICAL CONTACTS • CATHODIC PROTECTION ANODES • CHEMICAL ANODES • VOLTAGE REGULATOR DISCS • BEARINGS • WELDING CARBONS • MOLDS & DIES • SEAL RINGS • FRICTION SEGMENTS • ELECTRIC FURNACE HEATING ELEMENTS • CLUTCH RINGS • and other carbon, graphite, metal powder specialties.

## EQUIPMENT

(Continued from page 8)

sealed, transparent capsules which are weather and tamper-proof, requiring no maintenance. The useful life expectancy is 10 years or more. *U. S. Radium Corporation, Dept. RLC, Morristown, N. J.*

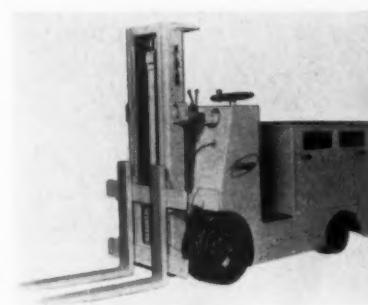


### Filter Cleaner

The Magnus Automatic Filter Dip is a machine to wash, rinse, oil and dry diesel locomotive air filters. This method handles filters by batches, using the full immersion method in the cleaning solution, rinse and oiling bath. Filters are agitated up and down in the solutions to speed up the cleaning and rinsing action.

Manual labor is restricted to loading and unloading the baskets. Filters are automatically moved from loading platform to cleaning tank, after they are transferred to the rinse tank by a conveyor, continuing the up and down agitation in the hot-water rinse. They are then immersed in the oil bath to insure a proper coating.

Automation takes the coated filters to a two-stage dryer and then returns them to their starting location. The machine permits one-man operation from one point, and processes 80 to 96 filters, flat or round, per hour. *Magnus Chemical Co., Inc., Dept. RLC, Garwood, N. J.*



### Large Capacity Fork Truck

A 6,000-lb capacity heavy-duty fork truck, just made available, incorporates a number of operating advantages. It provides for ease of mounting and demounting, where operators must leave the

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**WILL RERAIL ANY TYPE OR SIZE OF  
LOCOMOTIVE OR CAR IN RECORD TIME!**

Thousands in use by railroad operators all over the world. Recommended by Safety Inspectors and Engineers. Built of special alloy heat-treated steel for rugged service. Nolan Rerailers are used in pairs, and will retrack wheels from either or both sides of rail at same time. Each Rerailer straddles the rail, with the narrow end on top of the rail. The derailed wheel comes up the gradual slope, and is forced back on to the rail by the guiding grooves and ridges. Can be used anywhere on the track.

Size of Rerailer	For Use on Rails as Follows	Locomotive or Car Capacity
No. 2	16 lbs. to 40 lbs.	10 tons
No. 3	30 lbs. to 60 lbs.	15 tons
No. 3½	40 lbs. to 70 lbs.	20 tons
No. 4	50 lbs. to 75 lbs.	40 tons
No. 5	70 lbs. to 100 lbs.	100 tons
No. 5½	85 lbs. to 133 lbs.	200 tons
No. 5¾	85 lbs. to 155 lbs.	300 tons

F.O.B. Bowerston, Ohio

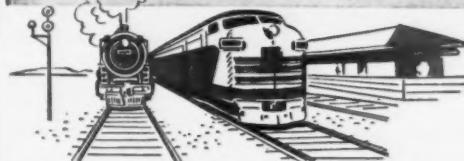
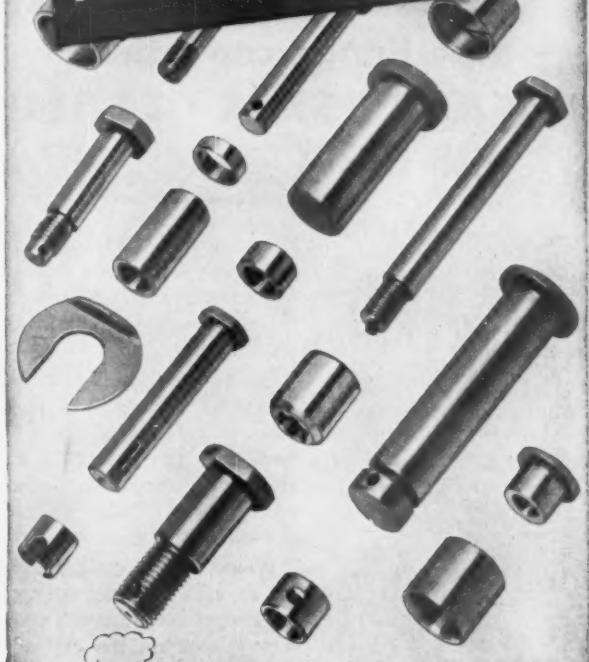
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and GROUND  
for LONGER wear**

**EX-CELL-O  
PINS AND BUSHINGS**



Keep your equipment out of the shop and on the rails with Ex-Cell-O steel pins and bushings. They give from four to six times longer service than ordinary pins and bushings. The tough ductile core of Ex-Cell-O pins and bushings withstands shocks, vibration; their hard case and fine finish resist abrasive action.

52-29

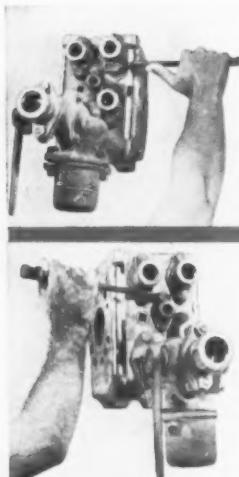
Standard styles and sizes of Ex-Cell-O pins and bushings for steam, Diesel, and passenger car equipment are given in the new Ex-Cell-O Bulletin 32559. Write today for your copy.

**RAILROAD DIVISION  
EX-CELL-O CORPORATION**  
DETROIT 32, MICHIGAN





**Now... REACH • GRIP • TURN  
pipe flange cap screws  
FAST • SAFE • EASILY  
with this *Snap-on* Wrench**



Here's a new, special *Snap-on* tool made to work where the closeness of cap screws to the sides of pipe flanges makes it almost impossible to use an ordinary wrench.

Built slim, the N-6142 wrench fits into these tight spots to turn the least accessible of the pipe flange cap screws. Snug and firm-fitting, it adds speed and safety to an otherwise time-taking, awkward job whether attaching or removing the pipe connections.

Wrench openings are 9/16-in. and 3/4-in. with the sides cut away to permit swinging the wrench enough to get a new hold on the cap screw. The double-broached openings will take a new "bite" with only a 30-degree turn.

***Snap-on* AB Brake  
Maintenance Kit**

All the tools needed to dismantle and assemble brake cylinders or remove and apply AB valves and triple valves. Use the *Snap-on* AB kit for brake work efficiency that only these specially selected tools provide.



Check on many other special *Snap-on* railroad tools and kits that keep costs down, rolling stock "on the move." Write for the *Snap-on* railroad division catalog of special and standard tools.

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*Snap-on Tools* Corporation.

**SNAP-ON TOOLS  
CORPORATION**

28th Avenue • Kenosha, Wisconsin  
8130-C



**EQUIPMENT**

*(Continued from page 10)*

truck frequently. An unobstructed operator's compartment permits mounting from either side, which is a safety feature. The operator has the advantage of good visibility even when large loads are handled.

Hydraulic lift and tilt provide fast operation. Brakes are hydraulic. The truck frame is of heavy gage reinforced formed steel plates electrically welded into a rigid box structure. Uprights are of alloy steel, hot pressed channels, with the inner uprights and elevator on widely spaced rollers.

Travel speed is 5.5 mph without load and 5 mph with full load. Hoist speed, with full load, is 20 fpm up, 40 fpm down; without load, 40 fpm up, 36 fpm down. The four-speed control is magnetic with time delay between speeds. Dead-man control is also included.

The drive unit consists of a motor vertically mounted and directly connected through a free coasting worm gear in first reduction and spur gear in second reduction. Drive shafts are mounted on taper roller bearings and are splined to a four-pinion differential. Wheels are connected to drive shafts through forged clutch plates which are doweled and bolted to the cast steel wheels and splined to the drive shaft. *Elwell-Parker Electric Company, Dept. RLC, 4205 St. Clair ave., Cleveland 3, Ohio.*



**Stainless Plug Cocks**

The galling of tank-car unloading connections is said to be eliminated using these key plugs made of V2B, a hardenable 18-8 stainless steel containing a small amount of beryllium. These cocks will handle acrylonitrile, butyraldehyde, ethylene glycol, glycerine, fatty acids, acetic acid, acetic anhydride, formaldehyde, toxaphene, phthalic anhydride, polyvinyl acetate, nitrogen fertilizer solution and nitric acid.

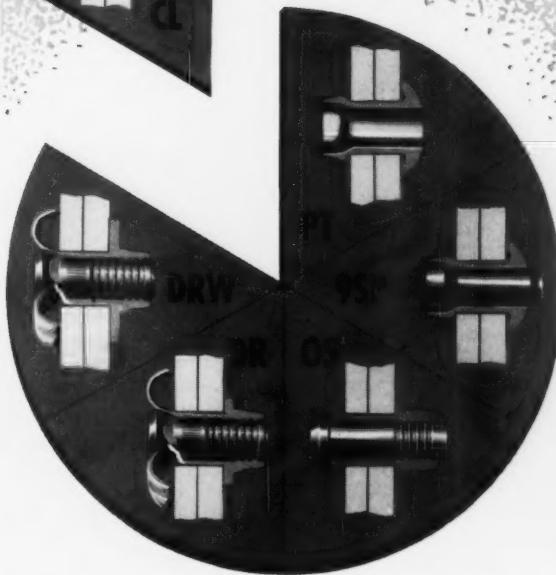
The alloy is soft enough to be machined in a quench-annealed condition. Heat treatment restores the gall-resistant characteristics. *Cooper Alloy Corp., Dept. RLC, Hillside, N. J.*

*(Turn to page 92)*

there's a

# HUCK

**FASTENER TO  
MEET YOUR  
REQUIREMENT**



Hundreds of manufacturers here and abroad have found the answer to their toughest fastening problems in HUCK'S complete line of commercial, positive-locking rivets.

Huck fasteners are available in many sizes and shapes to meet the many specialized requirements of industry, from railroads to electronic fabrication. Their fast, simple application and positive locking features save production dollars, time and trouble for their many users—producing a better fastening job.

Write or call for a HUCK sales engineer to discuss your problems. There's no obligation.

U.S. Patent numbers 2531048, 2531049, 2754703, 2527307 and patents applied for.

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MARCH, 1957 • RAILWAY LOCOMOTIVES AND CARS

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*Ready to go...  
wherever you go*



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with wrenchless chuck,  
forward and reverse ro-  
tation,  $\frac{1}{4}$  to 2" ca-  
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**TOLEDO Drop Head  
Ratchet Threader**—  
die change in a jiffy,  $\frac{1}{8}$   
to 2" sizes, light, con-  
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## First ASME Forum on Railroad Problems

A Railroad Division Technical Conference, intended to be the first of a series where advanced thinking on railroad problems can be considered, is to be held at the Sheraton Hotel, Chicago, April 25 and 26.

On Thursday morning, April 25, there will be a symposium on the use of economy type diesel fuels in locomotives. At the afternoon session the proper test techniques and equipment used in diesel engine and locomotive maintenance will be discussed.

Performance standards and recent developments in roller-bearing freight trucks, draft gears, and piggy-back equipment will be reviewed Friday morning, April 26. The afternoon session will be a symposium on corrosion prevention in freight cars, aluminum as a construction material will also be discussed.

A Railroad Division luncheon is planned for April 26, and a formal banquet and cocktail party for the evening of April 25. W. F. Ryan, president of the ASME, will speak at the banquet.

## AAR Approves Cast-Steel Wheel

On March 1 the AAR approved as standard, the one-wear cast steel wheels for freight car service. The date marked the high point in several years' research, experimentation, and field testing by two of the large producers of cast wheels—the Griffin Wheel Company and the Southern Wheel Division of American Brake Shoe Company (now the Railroad Products Division).

In 1951 the AAR granted permission to Griffin and Southern for each to place 1,000 cast steel wheels in test service under interchange freight cars. Griffin's wheel, with a carbon content of 0.75, was designated the AARX-3 wheel, and the Southern wheel, with a carbon content of 1.50, was designated the AARX-2. Manufacturing techniques of the two companies were subsequently described in Railway Locomotives and Cars —

Griffin in May 1953 and Southern in May 1955.

Reports on the performance of the test wheels were compiled regularly. To determine wearability, and accurate comparison with other wheels, each car used in the AAR tests was equipped with four cast steel wheels under one truck and four competitive wheels under the other. Griffin

had 1,064 wheels applied under 219 cars under this arrangement, and Southern had 202 wheels under 49 cars.

AAR quarterly reports indicate that Griffin wheels under the test cars averaged 88,700 miles, and Southern wheels averaged 141,400 miles.

When test wheels were inspected during this experimental period, wear

## SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

Item No.	FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)		11 months ended with November		
	Month of November	1956	1955	1956	1955
1 Road locomotive miles (000) (M2-111):					
1-05 Total, steam		3,590	5,678	43,069	60,494
1-06 Total, Diesel-electric		37,144	36,714	409,422	390,395
1-07 Total, electric		696	752	7,996	8,226
1-04 Total, locomotive-miles		41,691	43,370	463,260	461,581
4 Car-miles (000,000) (M-211):					
4-03 Loaded, total		1,664	1,697	18,604	18,436
4-06 Empty, total		972	963	10,356	10,082
6 Gross ton-miles-cars, contents and cabooses (000,000) (M-211):					
6-01 Total in coal-burning steam locomotive trains		9,210	12,796	107,275	139,565
6-02 Total in oil-burning steam locomotive trains		1,098	2,496	13,912	24,432
6-03 Total in Diesel-electric locomotive trains		107,692	103,250	1,182,791	1,107,103
6-04 Total in electric locomotive trains		2,157	2,196	24,891	25,061
6-06 Total in all trains		121,006	121,474	1,338,599	1,304,136
10 Averages per train-mile (excluding light trains) (M-211):					
10-01 Locomotive-miles (principal and helper)		1.02	1.02	1.03	1.02
10-02 Loaded freight car-miles		42.8	42.0	43.1	42.9
10-03 Empty freight car-miles		25.0	23.8	24.0	23.4
10-04 Total freight car-miles (excluding caboose)		67.8	65.8	67.1	66.3
10-05 Gross ton-miles (excluding locomotive and tender)		3,110	3,006	3,101	3,034
10-06 Net ton-miles		1,421	1,365	1,422	1,378
12 Net ton-miles per loaded car-mile (M-211):		33.2	32.5	33.0	32.1
13 Car-mile ratios (M-211):					
13-03 Per cent loaded of total freight car-miles		63.1	63.8	64.2	64.6
14 Averages per train hour (M-211):					
14-01 Train miles		18.7	18.5	18.6	18.6
14-02 Gross ton-miles (excluding locomotive and tender)		57,411	55,119	56,899	55,917
14-03 Car-miles per freight car-day (M-240):					
14-01 Serviceable		47.5	48.1	46.9	46.9
14-02 All		45.8	46.1	45.1	44.5
15 Average net ton-miles per freight car-day (M-240)		960	957	956	924
17 Per cent of home cars of total freight cars on the line (M-240):		41.2	40.4	41.7	45.2
PASSENGER SERVICE (DATA FROM I.C.C. M-213)					
3 Road motive-power miles (000):					
3-05 Steam		447	1,131	7,856	15,124
3-06 Diesel-electric		19,300	19,648	222,132	222,054
3-07 Electric		1,188	1,255	13,646	14,273
3-04 Total		20,935	22,033	243,636	251,458
4 Passenger-train car-miles (000):					
4-08 Total in all locomotive-propelled trains		213,632	226,201	2,519,217	2,573,284
4-09 Total in coal-burning steam locomotive trains		3,134	7,032	49,077	86,866
4-10 Total in oil-burning steam locomotive trains		407	2,759	14,760	44,580
4-11 Total in Diesel-electric locomotive trains		195,563	201,183	2,291,971	2,277,284
12 Total car-miles per train-mile		9.72	9.82	9.89	9.82

YARD SERVICE (DATA FROM I.C.C. M-215)					
1 Freight yard switching locomotive-hours:					
1-01 Steam, coal-burning		220,558	313,679	2,547,845	3,177,163
1-02 Steam, oil-burning		20,962	48,143	330,972	536,892
1-03 Diesel-electric		3,862,649	3,838,347	41,943,076	40,296,233
1-06 Total		4,108,083	4,204,771	44,862,031	44,078,950
2 Passenger yard switching hours					
2-01 Steam, coal-burning		4,900	7,731	62,136	91,640
2-02 Steam, oil-burning		2,386	5,441	35,204	58,222
2-03 Diesel-electric		241,035	240,162	2,714,223	2,677,149
2-06 Total		273,140	279,217	3,083,340	3,110,980
3 Hours per yard locomotive-day:					
3-01 Steam		7.2	7.0	6.4	5.9
3-02 Diesel-electric		16.0	16.4	15.8	15.7
3-05 Serviceable		16.0	16.1	15.7	15.4
3-06 All locomotives (serviceable, unserviceable and stored)		14.9	14.7	14.4	13.8
4 Yard and train-switching locomotive-miles per 100 loaded freight car-miles		1.71	1.72	1.67	1.66
5 Yard and train-switching locomotive-miles per 100 passenger train-car-miles (with locomotives)		.79	.76	.75	.75

<sup>1</sup> Excludes B and trailing A units



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measurements and contour of the flange, tread and rim were taken for comparison with original measurements. Rims of the test wheels were prick-punched at four positions 90 deg apart; original and subsequent measurements were taken at identical locations. The difference showed the amount of wear, which was averaged for each wheel.

Since flange wear is considered a high factor in condemning wheels for freight service, additional measurements were taken of the tread and flange contour, using a planimeter to measure the area between the original tread contour and the contour at various check mileages. This comparison of contour gave the amount of metal worn off each wheel.

According to one manufacturer—although the service records are not yet complete—indications are that the cast-steel wheel is highly resistant to wear, shell out, thermal cracking and brake burn. It is reported that records to date show the wheels equal, and in many cases surpass, the service performance of other wheels in freight car service.

### **W. M. Keller Gets New Title**

W. M. Keller has been appointed assistant vice-president, Operation and Maintenance Department, Association of American Railroads, with headquarters in Chicago. Mr. Keller continues also as executive vice-chairman and director of research, Mechanical Division.

### **AAR Vetoes Molygrease As Journal Box Lubricant**

Grease containing molybdenum disulfide should not be used as an additive in journal boxes in place of car journal oil, the AAR committee on lubrication has ruled.

The committee reported that tests show molygrease clogs the fibers of lubricating pads, decreasing their efficiency. Other tests, it said, show a detrimental effect on the wicking qualities of journal box packing partially saturated with molygrease.

### **ICC Wants To Prescribe Brake Rule**

The Interstate Commerce Commission has found itself without authority to

### **ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE FEBRUARY ISSUE**

Road and Builder	DIESEL-ELECTRIC LOCOMOTIVE ORDERS			Other detail
	No. of units	Horse-power	Service	
BELT OF CHICAGO: Alico Products	1	900	Switching	Delivered in Feb.
FREIGHT-CAR ORDERS				
Road and Builder	No. of cars	Type	Cap., tons	Details
BALTIMORE & OHIO: Pullman-Standard	200	Covered hopper	70	Approx. cost, \$1,700,000. Delivery expected fourth quarter this year.
CHICAGO & EASTERN ILLINOIS: Bethlehem Steel	300	Hopper	70	Cost, \$2,625,000. For June delivery.
CHICAGO, BURLINGTON & QUINCY: General American	75	Covered hopper	70	"Airslide" type. Estimated cost, \$975,000. Delivery expected third quarter 1958.
COLORADO & WYOMING: Pullman-Standard	25	Gondola	70	Estimated cost, \$220,000. Delivery expected late this year.
GENERAL AMERICAN TRANSPORTATION CORP.	1,400	Airslide	—	For 1957-58 delivery.
JERSEY CENTRAL LINES: Bethlehem Steel	50	Gondola	70	Unit cost, \$8,825. For delivery fourth quarter this year.
	50	Box	50	Unit cost, \$7,900. For December delivery.
KANSAS CITY SOUTHERN: Bethlehem Steel	75	Gondola	70	Approx. cost per unit, \$8,900. For fourth quarter delivery.
MACON, DUBLIN & SAVANNAH: ACF Industries	50	Covered hopper	70	Estimated cost, \$440,000. Delivery expected third quarter 1957.
MAINE CENTRAL: ACF Industries	200	Box	50	Estimated cost, \$1,600,000. Delivery to begin late summer.
MINNEAPOLIS, ST. PAUL & SAULT STE MARIE: Company shops	25	Box	50	Insulated. The 225 cars to be delivered in 1958.
NORFOLK SOUTHERN: Bethlehem Steel	200	Flat	—	Cost, \$345,000. For April delivery.
NORTHERN PACIFIC: General American	200	Gondola	—	Cost, \$345,000. For April delivery.
PHILADELPHIA, BETHLEHEM & NEW ENGLAND: Bethlehem Steel	50	Hopper	50	Estimated cost, \$275,000. Delivery expected late this year or early in 1958.
SEABOARD AIR LINE: Greenville Steel Car	12	Flat	50	With special bulkheads. Approx. cost \$125,000. July delivery.
UNION TANK CAR CO.: Company shops	32	Tank	—	Cap., 10,600 gal. For delivery this year.

### **INQUIRIES and NOTES**

LOCOMOTIVES: *Denver & Rio Grande Western*—Allocated \$2,548,130 for purchase of 10 SD-9 1,750-hp diesel-electric road-switching units for delivery June or July.

prescribe rules for the installation, inspection and maintenance of power brakes on railroad equipment, but it has assured the Brotherhood of Locomotive Firemen & Enginemen and Brotherhood of Railroad Trainmen that it will continue to seek legislation giving it such authority.

That's how the commission has disposed of a petition whereby the brotherhoods sought to have brake rules prescribed. The petition was opposed

by the Association of American Railroads, which contended that the commission lacked authority to grant the relief sought or even to conduct an investigation of the matter.

The commission heard oral argument limited to the question of its jurisdiction. While the brotherhoods contended that the commission had jurisdiction, their petition contained an alternative prayer that "all necessary steps" be taken promptly to secure the

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necessary authority if that contention were rejected.

The commission promise to do the latter was the result of its conclusion that there is a "definite need" for brake rules. It recalled that it supported a so-called "brake-inspection" bill introduced in a previous Congress. "We will," the report added, "continue to take appropriate action to secure the desired authority."

### Fuel Association Changes Name

As the result of a letter ballot of its membership, the name of the Railway Fuel and Traveling Engineers' Association has been changed to the *Railway Fuel and Operating Officers Association*. The next annual meeting of the Association will be held at the Hotel Sherman in Chicago, September 16, 17 and 18.

### Wheel Association Changes Name

Members of the Association of Manufacturers of Chilled Car Wheels at their recent annual meeting voted to change the name of the organization to the *Railway Wheel Association*. "This change was made so as to avoid the indication that the product represented was confined only to chilled cast-iron wheels," an association spokesman said. "Actually it will include the newly developed cast-steel wheels recently adopted by the Association of American Railroads as an approved standard for freight-car service."

Membership of the Railway Wheel Association is made up of all but one of the commercial manufacturers of cast-iron wheels in the United States and Canada. In addition, two of these members are also producers of the new cast-steel wheel in the United States.

The activities of the association will not be changed. The staff will continue to handle plant inspection and other technical matters relating to cast-iron wheels. They will also represent the manufacturers of both cast-iron and cast-steel wheels where the product in general is involved. This latter function would apply particularly to items on wheels being considered by various AAR committees.

Officers of the newly named association are Clifford M. Stoner, president and Raymond Wellington, secretary.

### SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
November, 1952	2,984,102	2,198	4,501	6,699	445,455
November, 1953	2,788,773	1,987	3,404	5,391	517,301
November, 1954	2,717,219	2,515	3,467	5,982	454,232
1955					
January	2,714,070	1,813	2,701	4,514	601,256
February	2,517,483	2,266	3,970	6,236	403,701
March	2,830,398	2,717	5,076	7,793	363,197
April	2,787,705	3,471	6,485	9,956	280,002
May	2,931,850	4,860	8,664	13,524	216,788
June	2,945,955	6,080	10,226	16,306	180,666
July	2,906,558	8,086	13,635	22,721	133,813
August	2,955,439	8,555	14,358	22,913	128,941
September	2,923,592	5,896	10,469	16,365	178,649
October	3,025,177	3,966	7,182	11,148	271,364
November	2,950,228	2,010	3,972	5,982	493,184
December	2,922,034	1,819	3,774	5,593	522,444

### Committee To Study Repair Charges and Billing Procedures

The AAR has formed a special working committee to further the studies of simplified procedures to reduce cost of billing for car repairs. The committee, consisting of three representatives with mechanical background and one with accounting, is made up of the following members: E. W. Gebhardt, district supervisor car maintenance, Chicago & Northwestern; J. P. Svetlicic, car foreman, Missouri Pacific; I. H. Mattern, foreman, car inspectors, Reading; J. B. Matt, special traveling auditor, Southern.

Considerable research will be involved and much of this in the field so as to have a sound basis for proposed charges as developed for consideration by the Arbitration committee for incorporation in the Interchange Rules. Field studies will be made on railroads in various geographical locations, to obtain representative conditions throughout the country.

Since this work will be carried on under the supervision of the Arbitration Committee, Interchange Rule No. 124 already provides a basis for the kind of survey which will be made.

The AAR expects these studies will be made at facilities such as repair tracks, train yards and billing office. It emphasizes that these studies will be made without interference with the working forces of the railroad and with minimum assistance from supervision. Practices followed by the various railroads will not be questioned

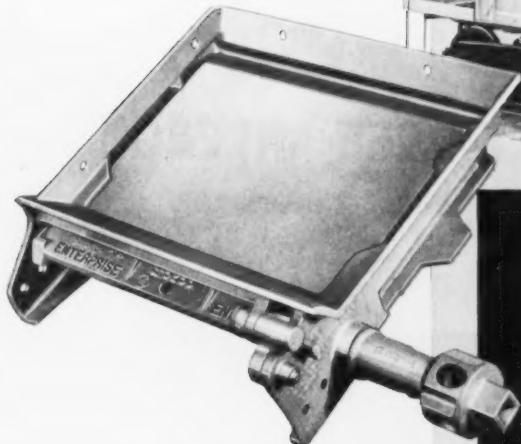
and the AAR prefers the working forces carry on their work in the regular manner in the event it becomes necessary to make checks covering some of the operations which are listed in the so-called price rules of the Interchange code.

The committee will make its first visit to a railroad in the near future, and the AAR urges the fullest cooperation with the group in order to obtain the greatest benefits for the railroad industry.

### 1956 Equipment Orders and Deliveries

Class I railroads put 1,453 new locomotive units in service last year, compared with 1,182 units in 1955, the AAR reports. Installations in 1956 included 1,445 diesel-electrics and eight electrics, while 1955 installations included 1,172 diesel-electrics and 10 electrics. Locomotive units on order January 1 for Class I railroads aggregated 814 (780 diesel-electrics, 30 gas-turbine-electrics, four electrics), compared with 854 units (827 diesel-electrics, 15 gas-turbine electrics, 12 electrics) on order January 1, 1956.

The backlog of freight cars on order and undelivered on January 1 totaled 117,257 as compared with 147,320 on January 1, 1956, according to ARCI and AAR reports. Cars ordered last year aggregated 41,223, compared with 169,872 in 1955 and 23,324 in 1954. Cars delivered in 1956 totaled 67,080, compared with 36,896 in 1955 and 35,558 in 1954.



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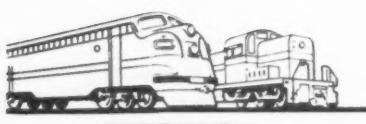
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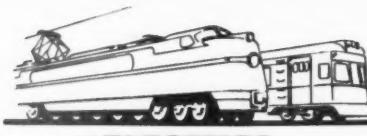


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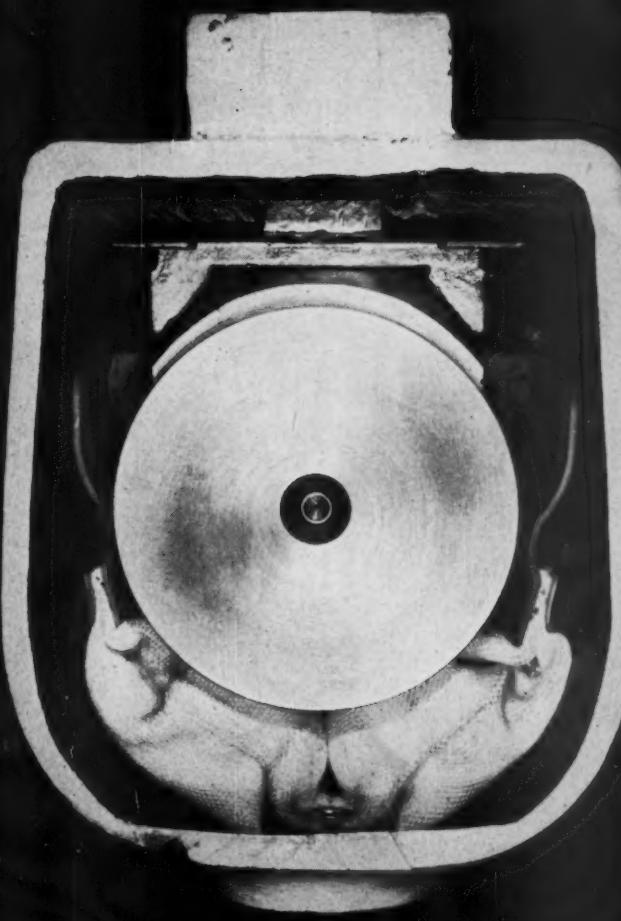
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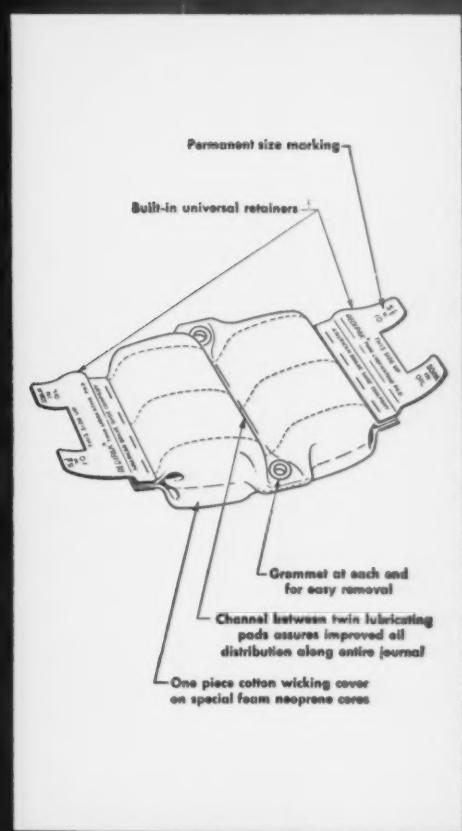
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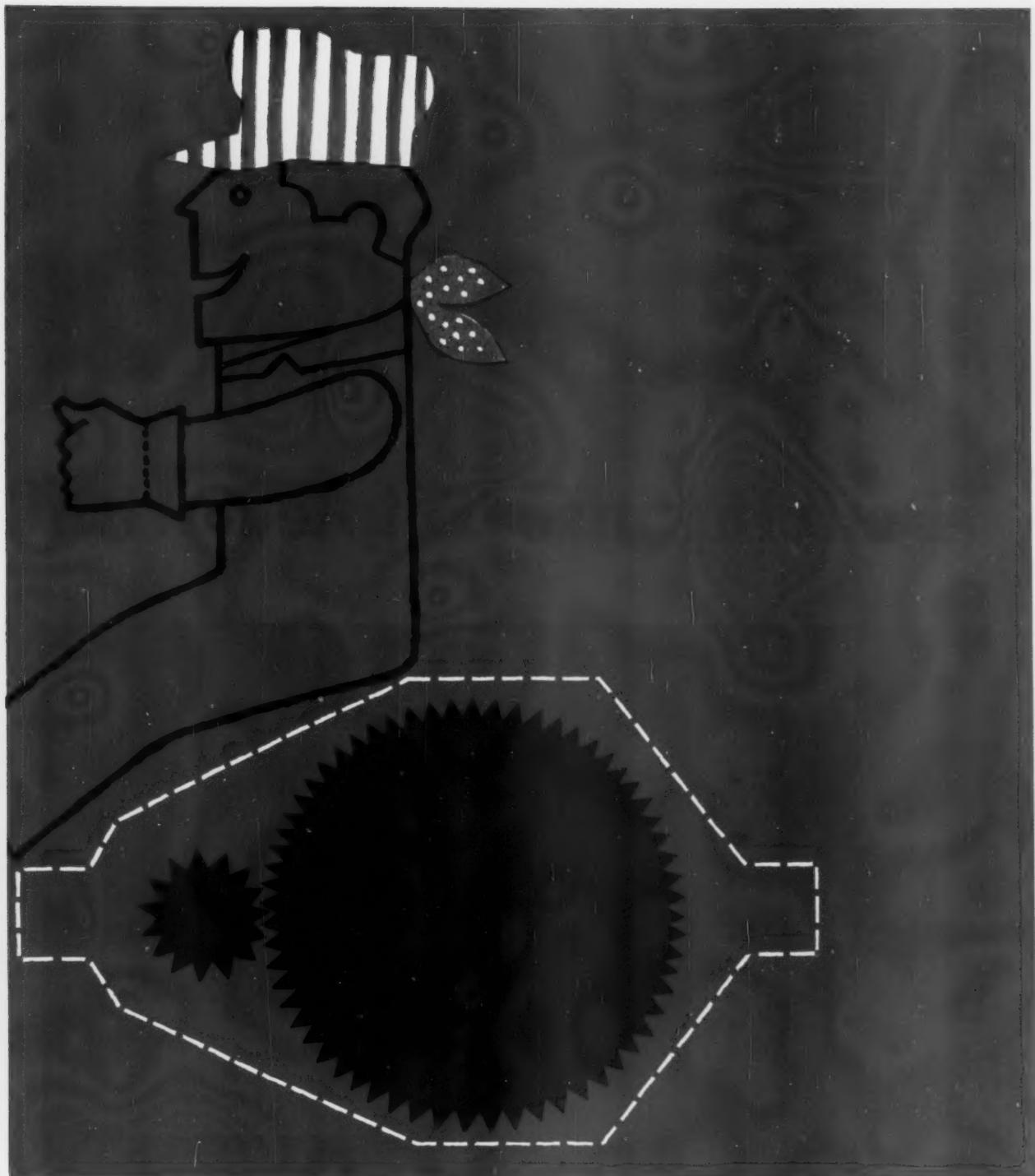
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**Excellent Structure Stability:** minimizes failures due to dry gears because of excessive gear case leakage.

**Excellent Wear Characteristics:** provides proper lubrication throughout life of gears.

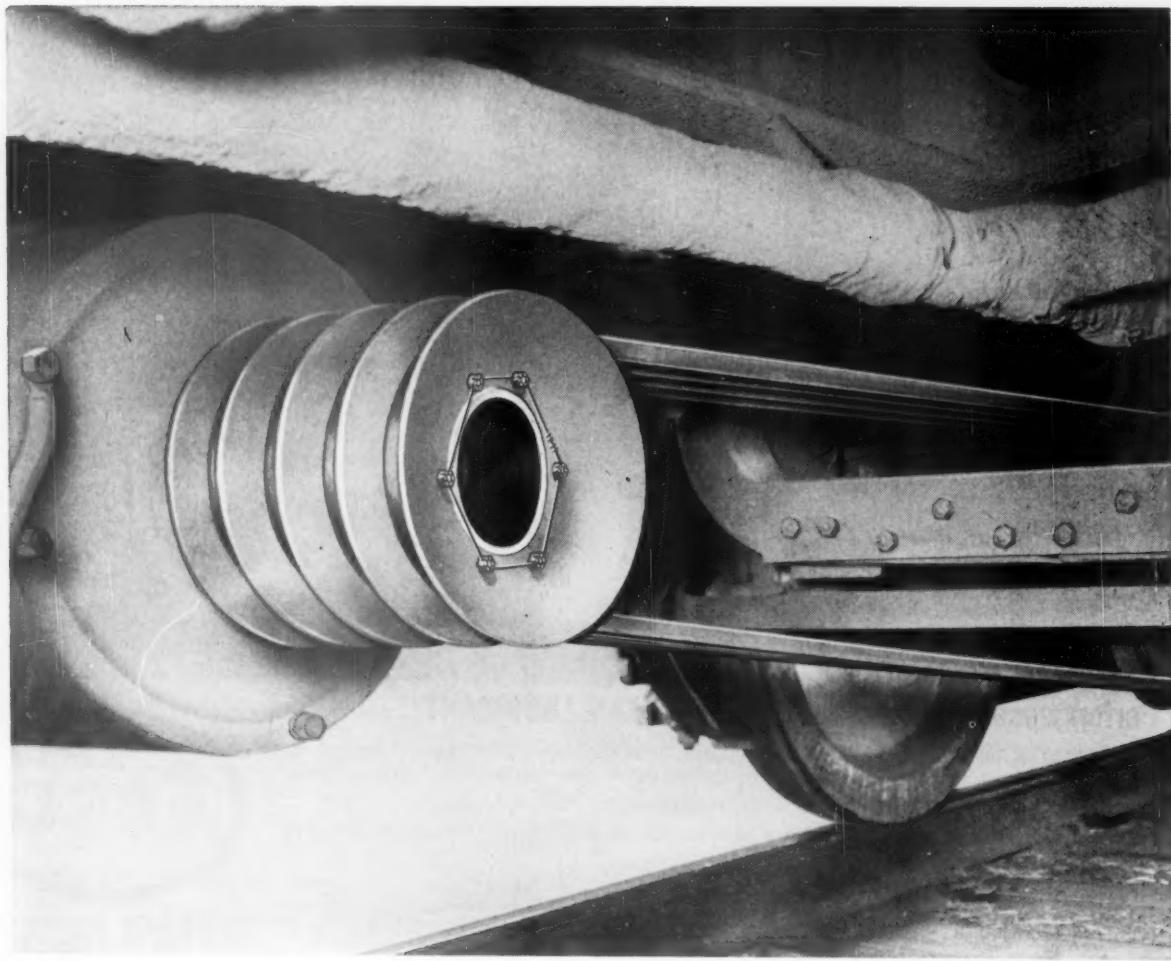
For complete information and technical assistance in the use of new Esso Arapen Gear Lubricant, call your local Esso office or write: Esso Standard Oil Co., Railroad Sales Div., 15 W. 51st St., N.Y. 19, N.Y.

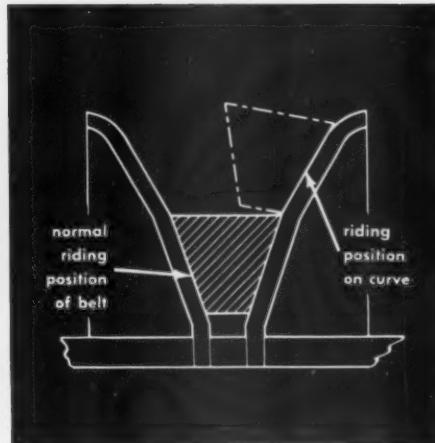
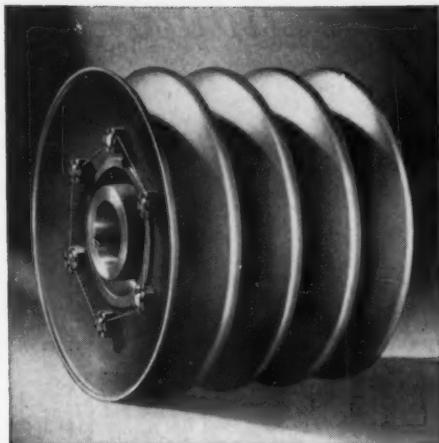


RAILROAD PRODUCTS

Dayton Lightweight Generator Pulleys are easy to handle, weigh 50% less than cast pulleys. After long, trouble-free service, individual worn flanges can be replaced, keeping maintenance low.

## Bearing life Tripled with





Double angle groove design of Dayton Pulleys keeps belts from "turning over" in the groove when the truck goes around a curve. Instead, belt slides up pulley side to second angle, providing full, positive power at all times.

# Dayton Lightweight Pulleys

50% Less Weight . . . Precision Balancing of Every Pulley . . .  
Cuts Vibration and Saves Armature Bearings.

Armature bearings lasted 3 and even 4 times longer in tests by major railroads, when generators were equipped with Dayton Lightweight Pulleys.

Made of highest quality pressed steel, these pulleys weigh approximately 50% less than heavy, hard-to-handle cast pulleys. Dayton's exclusive design and perfect balance virtually eliminate vibration. With weight cut in half and vibration minimized, wear on armature bearings is tremendously reduced.

When flanges finally do become worn after thousands of miles of service, Dayton Lightweight Pulleys further reduce costs and make replacement easier, faster. Flanges can be re-

placed individually instead of replacing the entire pulley, saving time and money.

Dayton Lightweight Pulleys in two, three and four groove sizes are available in both standard and offset models for all popular generator applications.

Best of all, these lightweight pulleys cost no more than outmoded, cumbersome, cast pulleys.

A Dayton Railway V-Belt Drive Engineer is ready to help you with a test installation of Dayton Lightweight Generator Pulleys or any other railway V-Belt Drive problem. Write The Dayton Rubber Company, Railway Division, Dayton 1, Ohio.

## Dayton Rubber

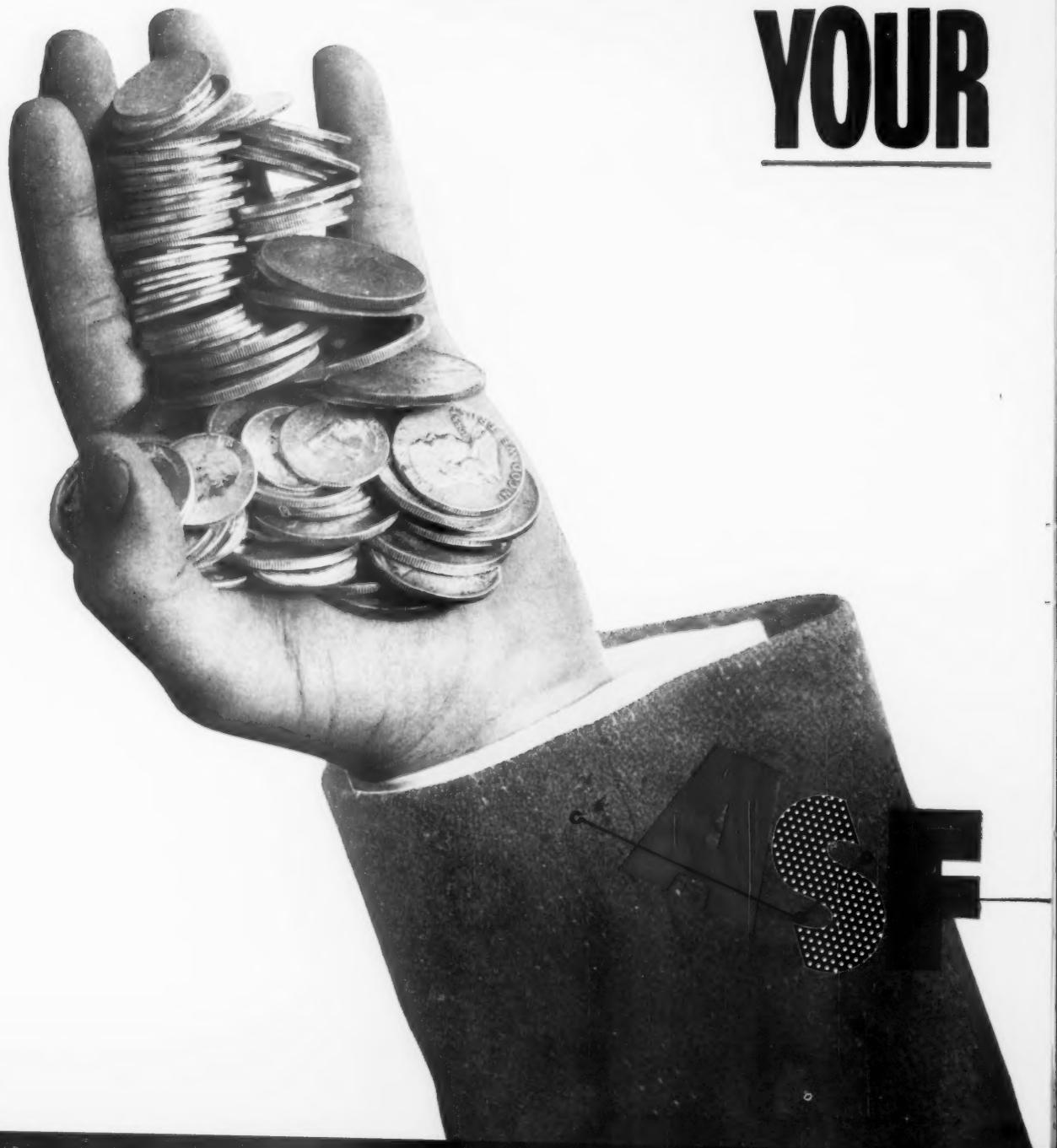
World's Largest Manufacturer of V-Belts

Specialized Railway Representatives in Atlanta, Chicago,  
Cleveland, New York, San Francisco and St. Louis

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*Now available-at*

# **HOW MUCH MONEY THIS SPRING SAVE YOUR**



*no extra cost . . .*

# CAN ON RAILROAD?

**Only you** can answer that question—because only you know what your spring-replacement costs are. But, *the higher they are, the more you will save with ASF Extended Life brand springs.*

That's because test after test in the laboratory proves that Extended Life Springs outlast ordinary springs an average of ten to one. The test results are so conclusive that it is not a question whether they will last longer under your cars, but only how many *times* longer. That depends entirely on your service conditions, of course.

Here's a way to find out: Specify new ASF Extended Life Springs where types of service or runs result in bad-order cars due to spring failure. You'll soon find that you get premium service—at no premium in price!



## **E-X-T-E-N-D-E-D      L-I-F-E      SPRINGS**

*A contribution to railroad progress...through research by*

**AMERICAN STEEL FOUNDRIES**

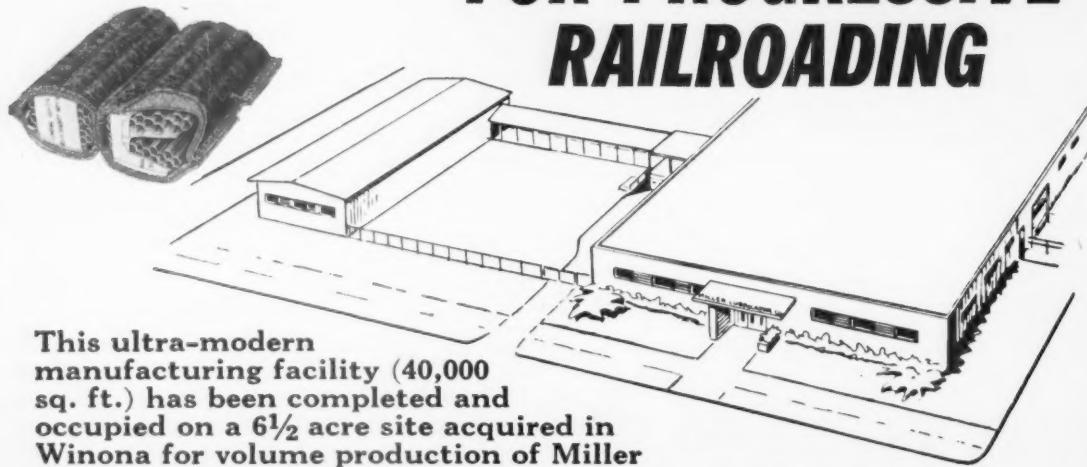
Prudential Plaza, Chicago 1, Illinois

Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec



66,000 CARSETS  
TO DATE

# FOR PROGRESSIVE RAILROADING



This ultra-modern manufacturing facility (40,000 sq. ft.) has been completed and occupied on a 6½ acre site acquired in Winona for volume production of Miller Center Feed pad lubricators.

Additional capacity, regardless of amount, to meet every Railroad requirement will be installed promptly when needed. 30,000 sq. ft. will be added early 1957.

- Volume quantities—immediate delivery
- Cost—\$40 per carset (for all sizes)
- Life expectancy—6 years

**MILLER LUBRICATOR CO., WINONA, MINN.**

## Short Cut

To Low Cost Wheel Maintenance

FCC Flange Cutters

ABRASIVE BRAKE SHOES

All Popular Patterns  
available from stock



WHEEL TRUING  
BRAKE SHOE CO.

628 West Baltimore  
Detroit 2, Mich.



## IT'S NOT TOO LATE . . .

... to get your complete set of the ROLL THEM OUT LIKE NEW series.

Chapter Two of this practical how-to-do-it series will appear in the April issue of Railway Locomotives & Cars.

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Above rates apply TO RAILROAD MEN ONLY (in the U. S. and Canada)

**STRONGER SILLS FOR  
WIDER DOORS**

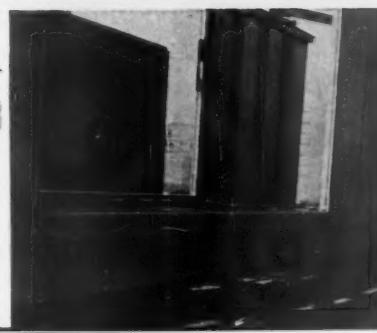


**M-F**

**Threshold Plates**

are permanently welded structural members of the car . . . they provide more rigid openings — more necessary than ever with wider doors!

Floor boards don't pass under the 'M-F' Threshold Plate — worn or broken floor boards are more easily and more quickly replaced.

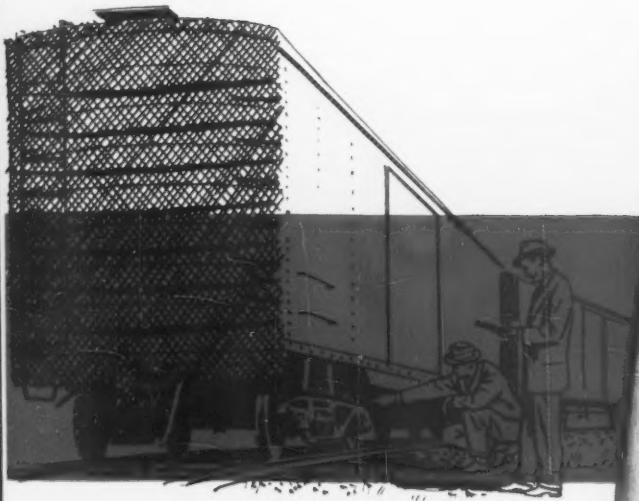


AND with the 'M-F' Threshold Plate uniform length floor boards may be used throughout the car.

**MAC LEAN-FOGG**

*Lock Nut Company*

5535 North Wolcott Ave., Chicago 40, Illinois  
In Canada: The Holden Co., Ltd., Montreal



**1953  
to  
1956**

Griffin EQS is placed in service under all types of cars and performance is so outstanding that the railroads move to adopt it as standard.



**GRiffin EQS**  
ELECTRIC QUALITY STEEL



**Griffin Wheel Company**

**445 N. Sacramento Blvd., Chicago 12**

In Canada: GRIFFIN STEEL FOUNDRIES, LTD., St. Hyacinthe, Quebec

Plants strategically located to serve all railroads



**1952**

Griffin announces an entirely new concept of producing freight car wheels . . . a steel wheel, pressure-poured in precision graphite molds to fine tolerances.

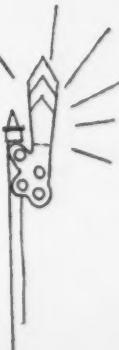


**1957**

**Griffin EQS...now approved as  
AAR STANDARD**

**Effective March 1, 1957**

*Give the "green" to **GRIFFIN** and watch your costs go down!*





with a **UNIONMELT**  
**Flexible Welder**

A UNIONMELT flexible welder simplifies and speeds fabrication of a hopper car.

Wherever flexibility and maneuverability are required in welding, the UNIONMELT flexible welder far outperforms rigid, mechanical installations . . . Welding in corners and in tight spots is no problem with this sturdy portable unit, and top quality welds are produced at speeds up to 40 inches per minute in many operations. The combination hopper and welding head is lightweight, and requires no special skill to operate.

**Combines Advantages**

This UNIONMELT flexible welder combines the speed of

mechanized installations with the operational freedom of manual welding. Wire feed unit and controls are mounted on a mobile carriage which can be moved quickly from one job to another, or from point to point on the same job. Initial investment for flexible welding equipment is considerably less than for stationary automatic welding installations—operations are economical, and maintenance costs are low.

For more information on this and other modern methods for car fabrication, call your local LINDE representative, or write today for free illustrated literature.

**RAILROAD DEPARTMENT**

**Linde Air Products Company**

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street **UCC** New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY  
Division of Union Carbide Canada Limited, Toronto

The terms "Linde", "Oxweld", and "Unionmelt" are registered trade-marks of Union Carbide.

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol . . .



new

# GULF DIESELMOTIVE 78

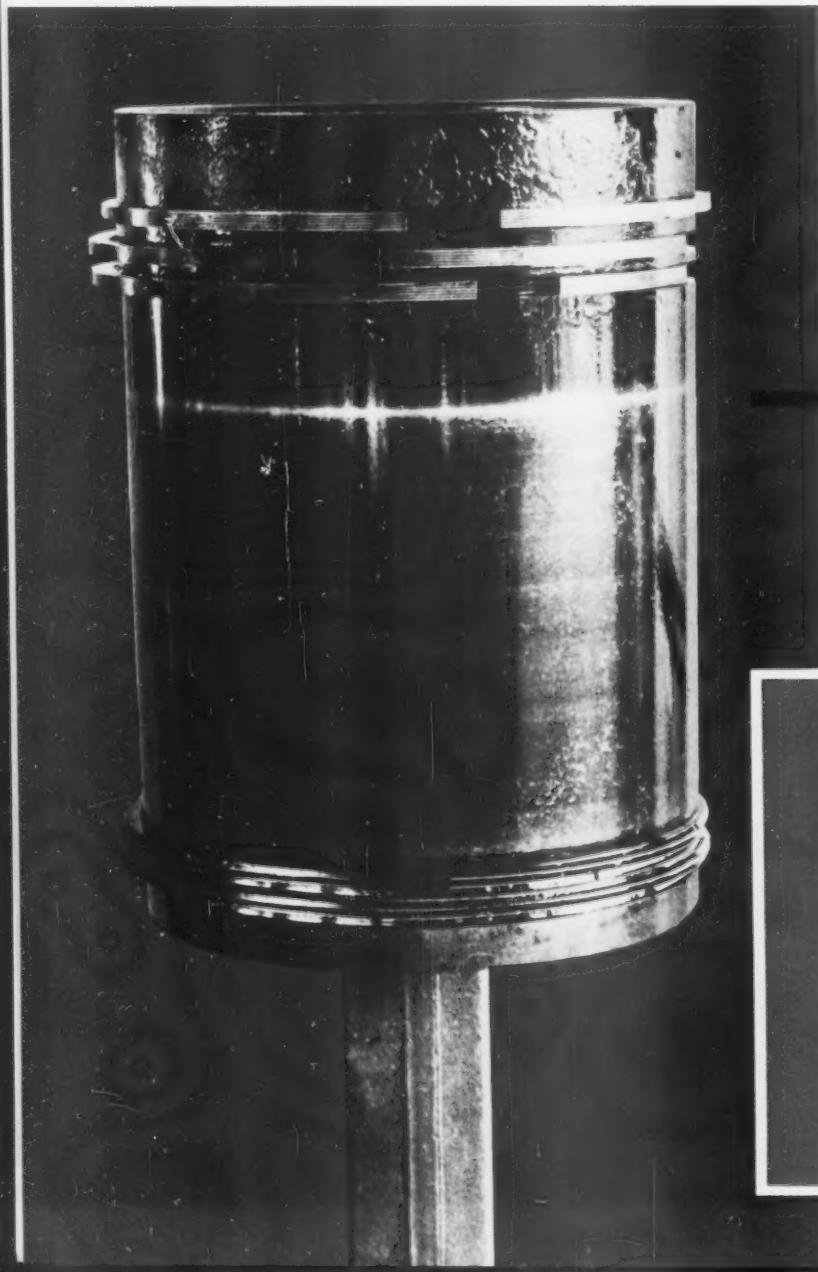
—the oil that helps engines  
maintain full-rated power!



**new**

# **GULF DIESELMOTIVE 78**

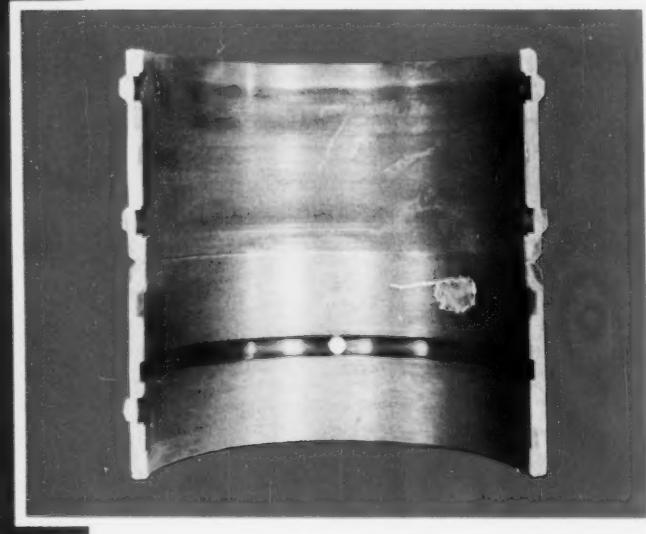
## **keeps engines operating at top capacity**



Your engines will stay cleaner longer with new Gulf Dieselmotive 78. This new oil is formulated with base stocks that have inherent film strength, lubricity and excellent oxidation characteristics . . . providing a built-in safety factor. In addition, new Gulf Dieselmotive 78 has about twice as much additive as ordinary Diesel engine oils! This additive reserve insures cleaner engines, less wear on rings, pistons and liners than ever before!

After 165,825 test miles on Gulf Dieselmotive 78, the pistons looked like this upon removal from an engine. All the rings are free and ring wear is at a minimum. Under-crown deposits are negligible. Note freedom from any substantial lacquer deposits on piston skirt.

Main bearings are free of lacquer and ready for further service, after their long trial period of 165,825 miles of operation.





View of ports and top 3 compression rings after 165,825 test miles and before engine disassembly. Note excellent piston ring condition and exceptional port cleanliness.

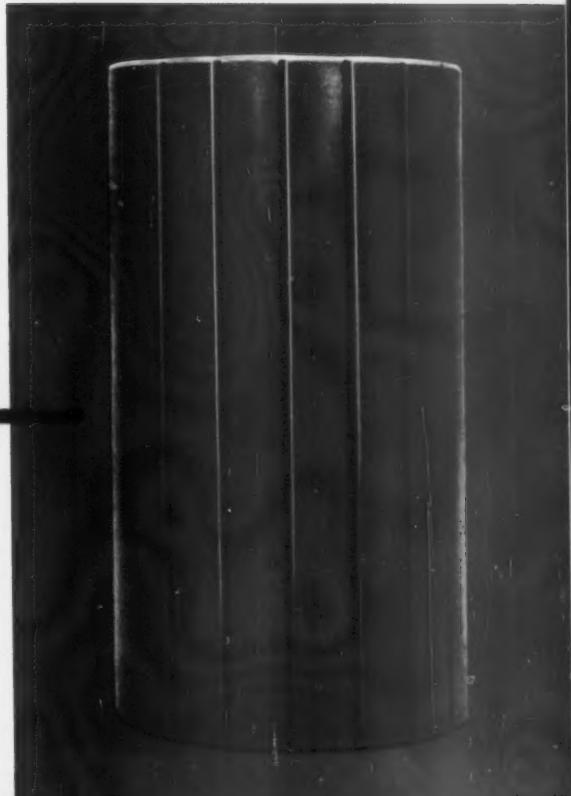
## proved in **Southern Pacific Railroad tests over 330,000 miles of toughest freight hauls!**

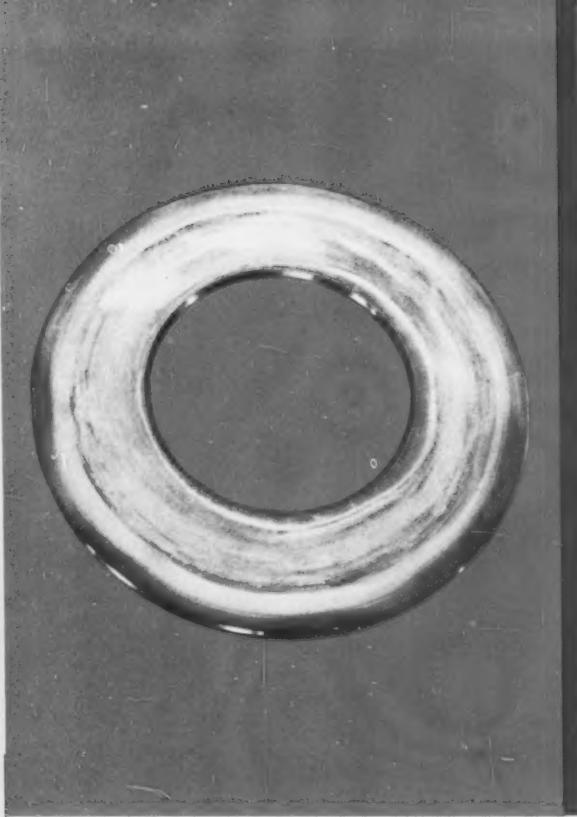
In a grueling 330,000 mile test, Gulf Dieselmotive 78 was used in EMD 567-C units on Southern Pacific Lines in Texas and Louisiana. On this tough run, ambient temperatures range from 0 to 110°.

After 165,825 miles, a detailed inspection was made of the engines. Rings and ring grooves were extremely clean, as were all intake ports. Deposits under the piston crown were negligible. There were no heavy deposits or varnish anywhere in the engine. And main bearing shells were in such excellent condition that they were put back in the engine for further service!

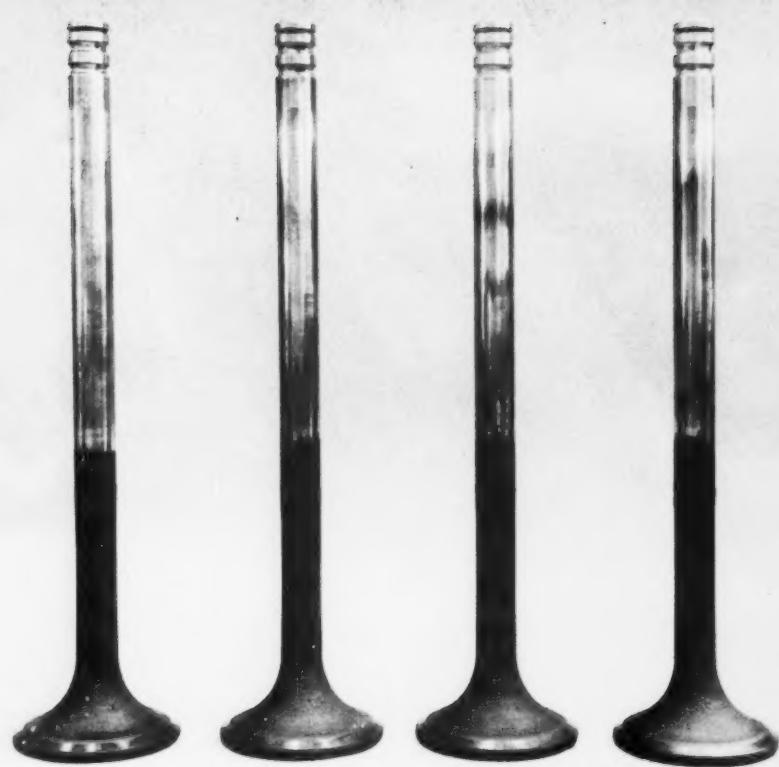
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Wrist pin bushing shows no corrosive etching at edge of silver plating adjacent to grooves. There is no evidence of scuffing on the silver plating, even after long periods of high output service. This bushing was reinstalled for further service.





Note excellent condition of thrust washer.  
Wear was well below condemnation limits.



Note excellent condition of exhaust valves and absence of any hard carbon deposits. Valve stems show no significant lacquer or carbon deposits at point of valve guide travel limit.

New Gulf Dieselmotive 78 retains its stability even when subjected to high temperatures for extended periods. This oil enables high output engines to deliver their full rated horsepower. Under certain conditions, railroads can even increase the tonnage rating of their locomotives!

Find out now what new Gulf Dieselmotive 78 can do for *you*. Contact your nearest Gulf office, or use the coupon below for further information.

GULF OIL CORPORATION  
1822 Gulf Building, Pittsburgh 30, Pa.

- Send more information on Gulf Dieselmotive 78.
- Have a Gulf Sales Engineer call.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



**GULF OIL CORPORATION**  
1822 Gulf Building  
Pittsburgh, Pa.



## *Now Perishables Travel in Style*

Mechanical reefers are big news today—and good news to shippers of fresh and frozen foods. These de luxe refrigerator cars carry all types of perishables—quickly, cheaply, and above all safely—to markets all over the country.

Fruit Growers Express and its associates, Western Fruit Express and Burlington Refrigerator Express, now point proudly to more than 1000 of these supercars in service. And others are on the way. In the very near future, nearly 1300 will be available to the nation's shippers.

Refrigeration is completely automatic; thermostatic controls make possible any temperature between zero and 70 deg F. Thus, whether a cargo requires subfreezing cold or moderate warmth, the proper "weather" can be maintained throughout an entire journey.

Needless to mention, these fine new cars are equipped for fast travel and heavy loads. They skim over the rails on husky, durable wrought-steel wheels and forged-steel axles, many of which are of Bethlehem manufacture. Since Bethlehem wheels and axles are completely at home in high-speed, heavy-duty service, the choice was of course appropriate from every standpoint.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

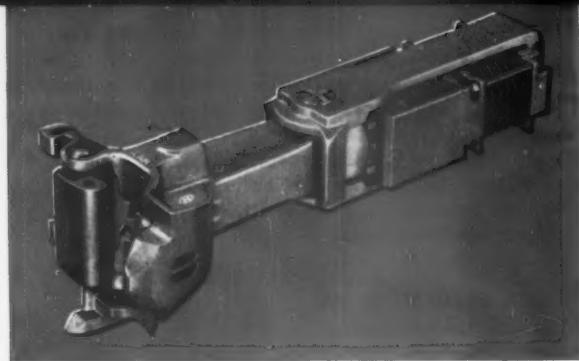
### **BETHLEHEM WROUGHT-STEEL WHEELS**

COMPANIONS TO BETHLEHEM FORGED-STEEL AXLES

FREIGHT • PASSENGER • DIESEL



**There's Improved Railroading  
with National Specialties**



*Draw Gear Assembly*

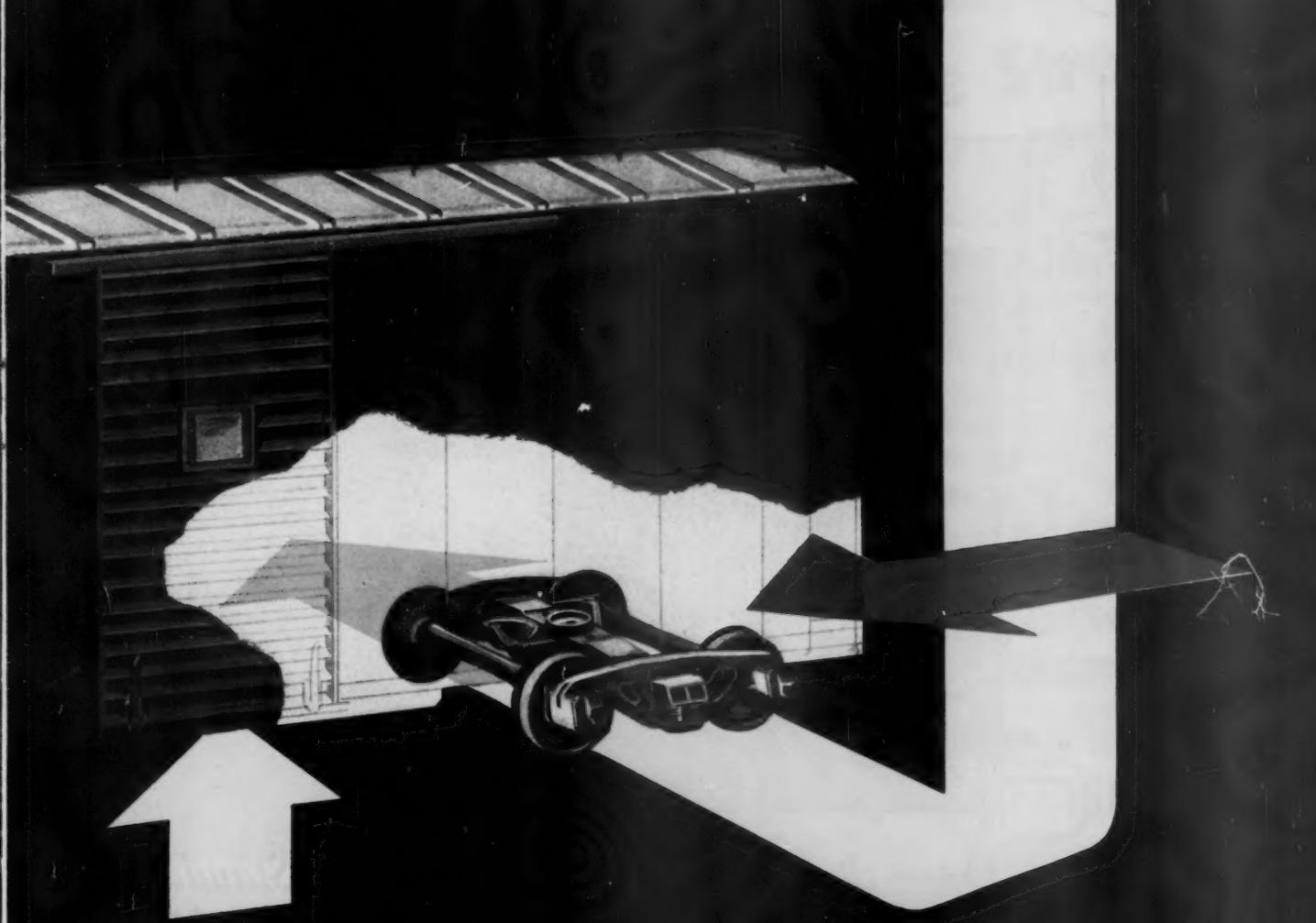
Reduce costly maintenance of cars by using National MF-400-1 Rubber-Cushioned Draft Gears, with National Type F Interlocking Couplers and National Y-45 Yokes. This combination makes a perfect shock control team to effectively cushion end-to-end impacts.



**NATIONAL** MALLEABLE  
and STEEL

Railway Division Headquarters  
Cleveland 6, Ohio

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS  
SNUBBER PACKAGES • JOURNAL BOXES

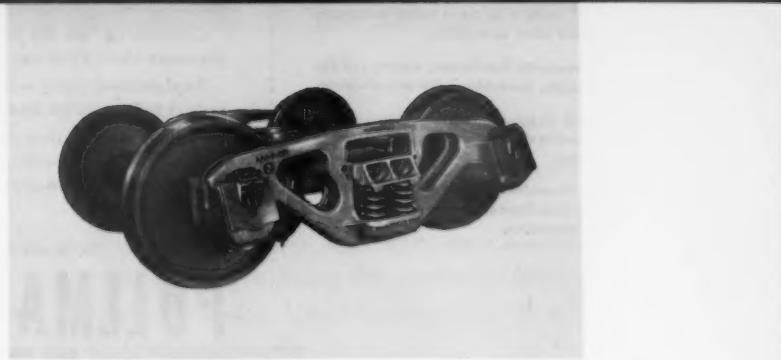


## **FROM EVERY DIRECTION** *reduces maintenance*

### *National C-1 Truck*

With built-in friction control devices, C-1 trucks provide positive *lateral* control and protection against *vertical* shocks for a smoother ride that reduces damage to rolling stock, lading and roadbed.

AG-108



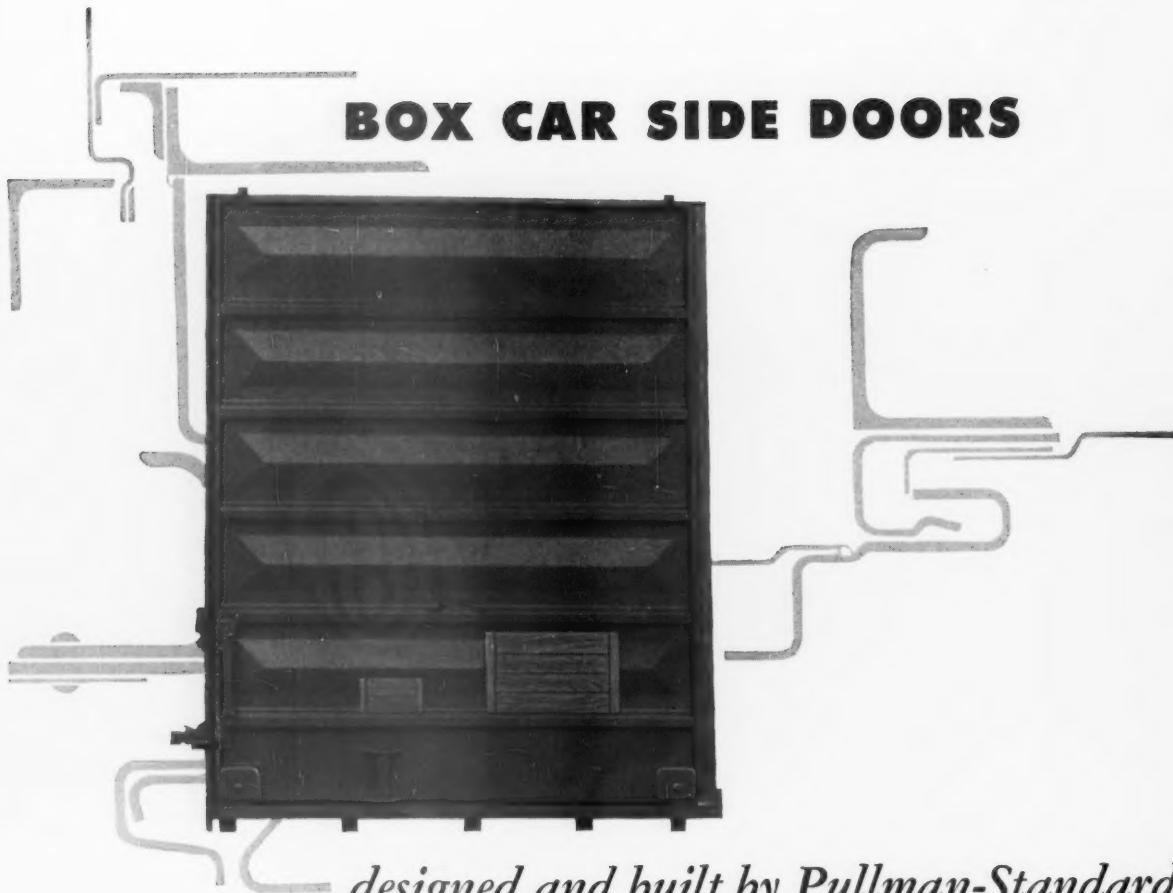
## **CASTINGS COMPANY**

International Division Headquarters  
Cleveland 6, Ohio

Canadian Subsidiary • National Malleable & Steel Castings  
Company of Canada, Ltd. • Toronto 1, Ontario

*Established  
in 1868*

## BOX CAR SIDE DOORS



*designed and built by Pullman-Standard*

- Design: by the world's largest car-builder . . . with fifteen years' experience in door manufacturing.
- Size: 9' 11" or specified height, 6'-7'-8'-9" or specified width.
- Complete with fixtures and sub-parts, all to P-S design.
- Panels of .10-inch corrosion-resistant copper bearing steel. Lock, starter and bumper of cast steel. All parts weldable.
- Extra-heavy (5/32-inch) bottom member.
- 5" rollers in door roller assembly insure easy operation.
- Precision fabricated, embossed for strength, assembled by arc-welding.
- All around sealing arrangement excludes dirt and weather, safeguards loading.
- Self-protecting design and fabrication excellence mean long life, easy maintenance.

Pullman-Standard has designed, built and laboratory and service tested a new box car side door, with integral fixtures, to fill the needs and specifications of the railroad industry. Offering maximum lading protection from dirt and weather, this new door is sealed all around by specially designed interlocking contours. The unit rolls smoothly and easily on large 5-inch diameter rollers with hardened roller bearings. The safety latch and door lock work as a unit. And the safety latch automatically locks the door in either the open or closed position after one car impact. The entire door and fixture unit is made for lasting service, durability and rugged strength.

After extensive field research to determine railroad and shipper requirements, prototypes of this door were designed, built and put into continuous laboratory and in-service tests more than three years ago. Every possible test was applied time and time again. The P-S Door withstood every abuse. Example: over 75,000 severe individual roller and bearing impacts were test-applied to prove the door roller assembly.

Confirming "on the job" acceptance of this new unit by America's railroads are the more than 2500 car sets now in service or on order by 12 major users.

Replacement parts will be kept on hand by Pullman-Standard, and railroad orders will be filled immediately from inventory.

For full information on the new P-S Box Car Side Door, and how it can be applied to PS-1 Box Cars now on order, write for literature or contact the nearest Pullman-Standard sales office.

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

# PULLMAN - STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

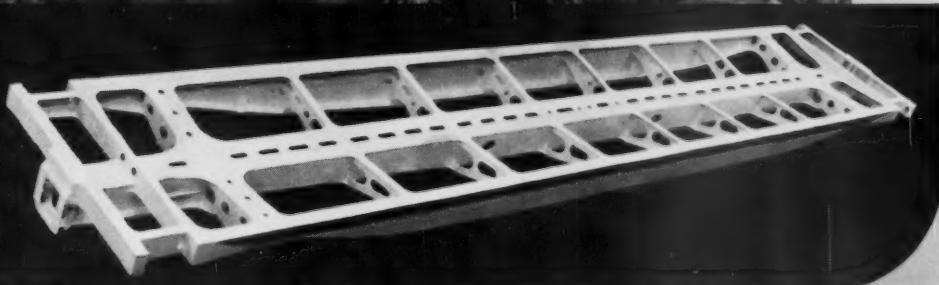
221 NORTH LA SALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

# For Greatest Underframe Strength



250 now building or on order for the St. Louis-San Francisco Railway



Again Frisco specifies Commonwealth Underframes for greater payload . . . more round trips per month . . . lowest upkeep costs and maximum revenue. The larger capacity of these well designed 70-ton cars—approximately 30 cords—is made possible by the greater strength at less weight of Commonwealth one-piece cast

steel Underframes and interlocking bulkheads.

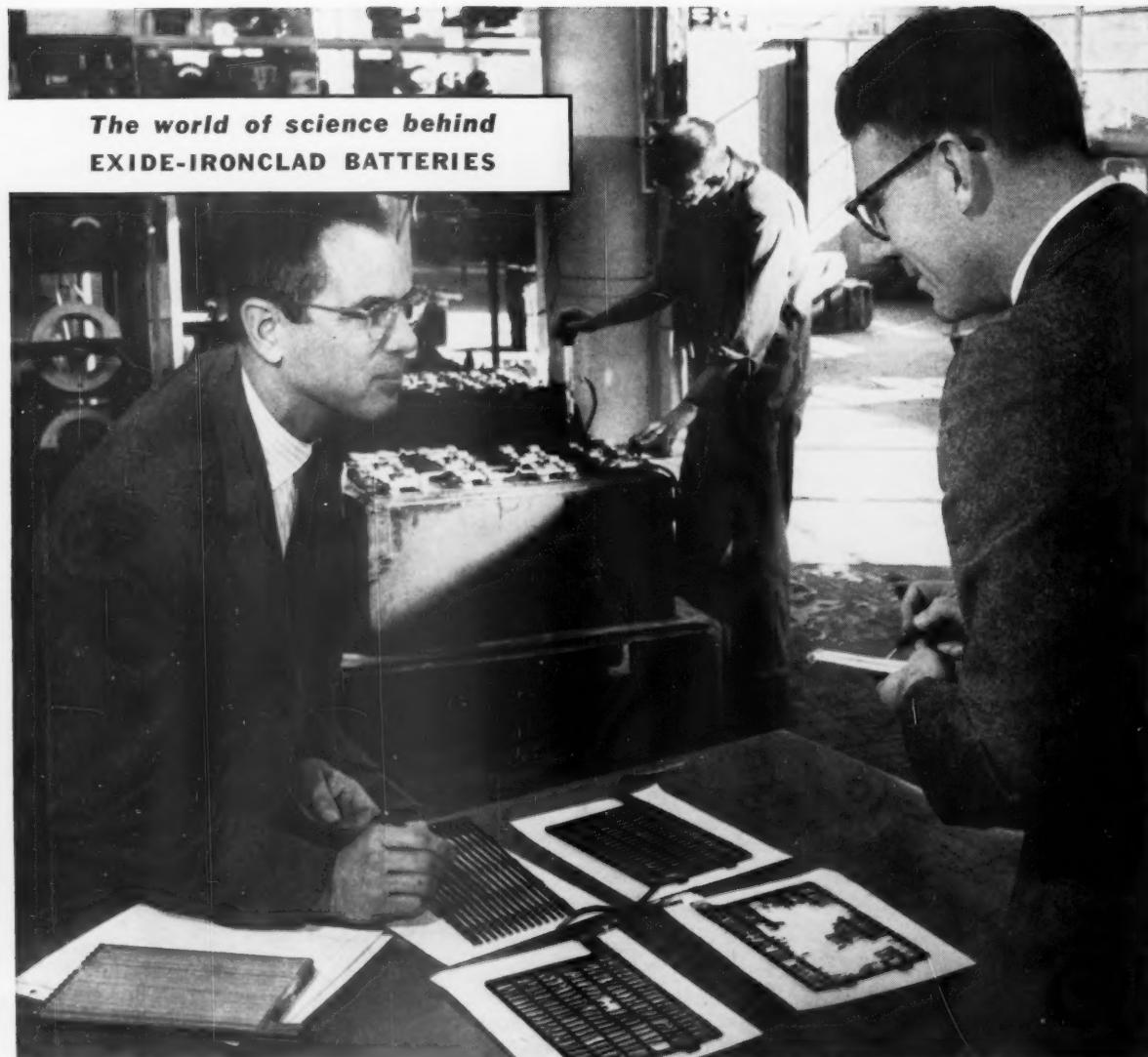
What's more, corrosion is no problem, and these cars provide longer life, continuous availability with Underframes that are *maintenance-free*. If you aren't realizing the profitable investment Commonwealth Underframes offer, it will pay to investigate now.



## GENERAL STEEL CASTINGS

GRANITE CITY, ILL. • EDDYSTONE, PA. • AVONMORE, PA.





**The world of science behind  
EXIDE-IRONCLAD BATTERIES**

*Being interviewed is W. W. Smith, Divisional Manager, Product Engineering. Grids in back are of Exide's exclusive Silvium. Those in front are ordinary alloys.*

**"All of these alloys had the same acid test"**

*At the Exide Laboratories—***Reporter:** Was it a typical charge-discharge test normally used to test battery components?

**Smith:** Right. And the two positive plate grids with no visible signs of corrosion are Exide's patented Silvium alloy.

**Reporter:** How about the others—what alloys are they?

**Smith:** They're standard alloys used in other well-known makes of batteries. But they don't have Silvium's corrosion-resisting ingredients.

**Reporter:** Where is Silvium used?

**Smith:** In the positive plates of all Exide-Ironclad and many other Exide Batteries.

**Reporter:** How does it affect battery performance?

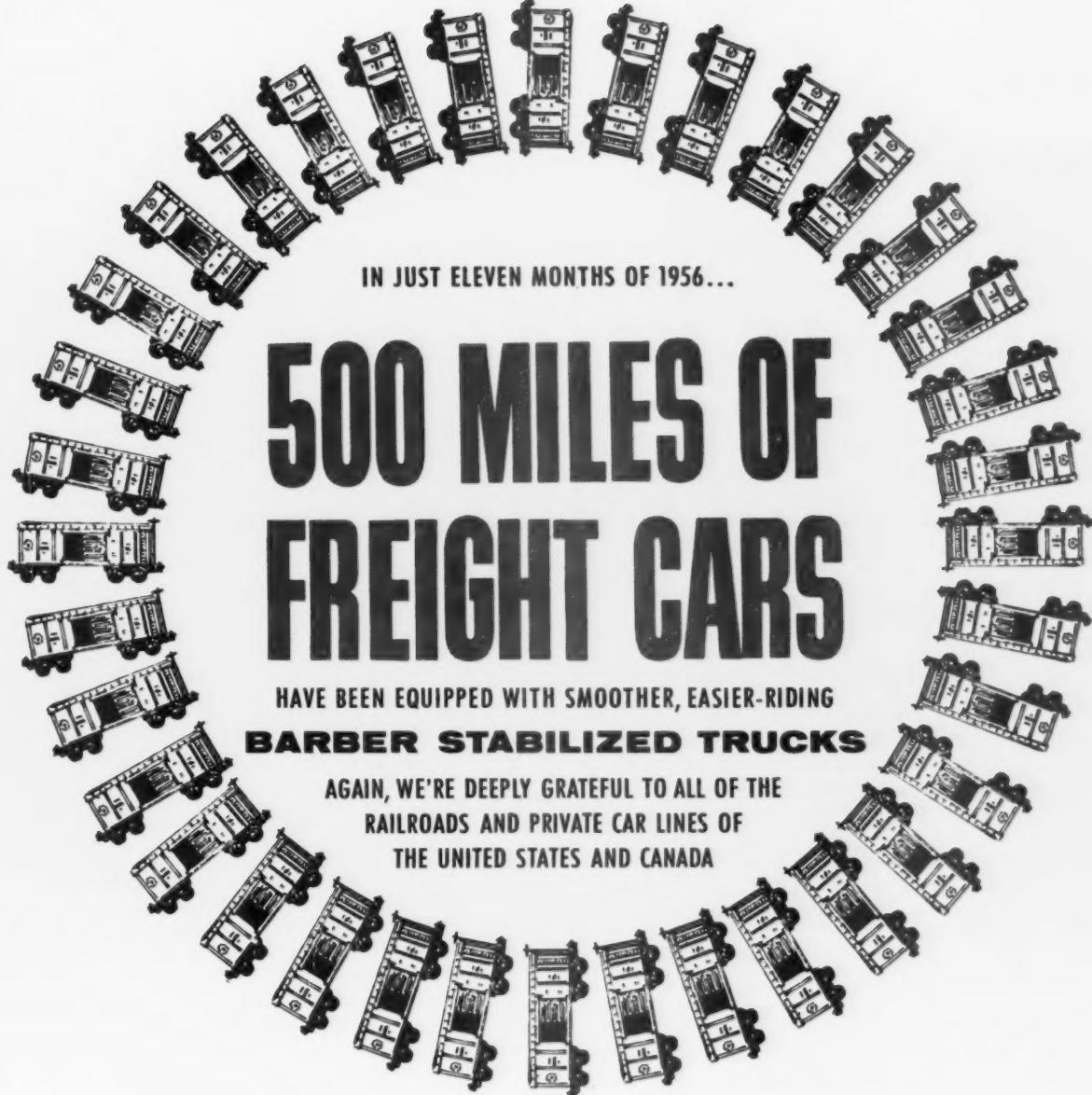
**Smith:** Every test we've made proves it stretches battery life because the grid resists corrosion—sometimes up to 100% longer.

**Reporter:** Obviously this is an important feature of the Exide-Ironclad.

**Smith:** Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

**Note to battery users:** Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.





IN JUST ELEVEN MONTHS OF 1956...

# 500 MILES OF FREIGHT CARS

HAVE BEEN EQUIPPED WITH SMOOTHER, EASIER-RIDING

## BARBER STABILIZED TRUCKS

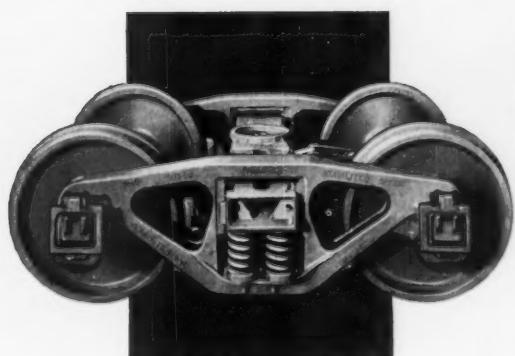
AGAIN, WE'RE DEEPLY GRATEFUL TO ALL OF THE  
RAILROADS AND PRIVATE CAR LINES OF  
THE UNITED STATES AND CANADA

*They cost so little... give  
so much protection...*

# BARBER

## STABILIZED TRUCKS

Standard Car Truck Company, 332 S. Michigan  
Ave., Chicago 4, Illinois. *In Canada: Consolidated  
Equipment Co., Ltd., Montreal 2.*



# Here's why FREIGHT CARS NEED **SOLID JOURNAL BEARINGS**

It's not just a question of low initial cost: you also choose solid-type bearings because they offer the utmost in load capacity, protection for lading, ease and simplicity of maintenance and many other advantages. They all add up to a BIGGER NET RETURN per car dollar invested.

SURE, you get up to 10% more cars for your money, up to 10% more car availability, and hence more freight revenue per car dollar invested with low-cost solid bearings. But there are many other inherent advantages, too. Let's take a quick look.

## 1. Unrestricted as to Speed and Load

Steel, stone, ore—you can take the biggest loads with solid bearing cars—right up to axle capacity. Solid bearings reduce these maximum loads to about 700 psi—well within bearing and oil film capacity. (Compressive strength of the babbitt at highest normal temperatures is over 7200 psi.)

What about speed? Oil film pressures increase with speed. You get a thicker film of oil that more than compensates for any viscosity change. *With solid bearing cars you're actually better off in the higher range of freight train speeds.*

## 2. Ease and Simplicity of Maintenance

The AAR journal bearing assembly is a simple standard. Internal parts can be easily inspected or removed—without special tools or equipment, with the minimum of effort and time.

There's no need for expensive shop facilities or skilled labor. Stocking of parts is simple and replacements are available at any repair point of any line. And unlike other bearing types, in the event of road failure you can almost always make necessary repairs and bring a solid bearing car in on the same wheels.

## 3. Greater Protection for Lading

With solid bearings lading gets the smoothest possible ride on standard freight car trucks. That's because lateral shocks are flexibly controlled—not rigidly opposed. This means less wear and tear on car bodies, trucks, wheel flanges and rails, too!



## 4. Weight and Resistance Advantages

In motion the solid bearing glides on a film of oil like a skater on ice. Dynamic resistance is as low or lower than that of any other type of bearing—averages less than one pound per ton regardless of the outside temperature or speed of operation.

Solid bearings also save many tons unsprung dead weight on every moving train. Lighter weight, plus lowest possible resistance in pounds per ton, puts the maximum tractive effort of the locomotive to the business of moving goods.

## 5. Improved Dependability in Freight Service

Solid bearing performance is getting better all the time. In 1954, there was only one set-off for every 15 cars—equivalent to each car operating 15 years per road failure of a bearing. And this average car was almost 20 years old. You can bet that other bearing types would have a tough time trying to beat that record.

Better still, means are now available to reduce journal box servicing requirements and get still better solid bearing performance. Improved bearings and lubricators are now being installed. Periodic servicing—on a calendar basis—and 3-year repacks will not be far behind.

You save money in many ways with solid bearing cars, and you will save even more in the future. With so many inherent advantages, you just can't beat solid-type bearings for railroad rolling stock!

Magnus Metal Corporation, 111 Broadway, New York 6; or 30 E. Jackson Blvd., Chicago 4.

**MAGNUS**  
**Solid Bearings**

MAGNUS METAL CORPORATION

Subsidiary of NATIONAL LEAD COMPANY



# Diesels Are Showing Their Age

*ICC inspections reveal "deterioration" in locomotive fleet reflected in more defects and in more units ordered out of service.*

Nearly eleven per cent of the diesel units inspected by ICC inspectors during the year were found defective, and the number of units ordered out of service jumped from 127 to 492 according to the 1956 report of the ICC's Director of Locomotive Inspection. Tougher federal inspections and failure of railroads to keep their aging motive power in "like new" condition are playing a part in the poor results.

The 45th annual report has summarized much of last year's work by stating that "the increase in the number of locomotives found defective, the number of defects found, the percentage of inspected locomotives found defective and in the number ordered out of service is a reflection of the deterioration resulting from increasing age of the now predominating diesel power."

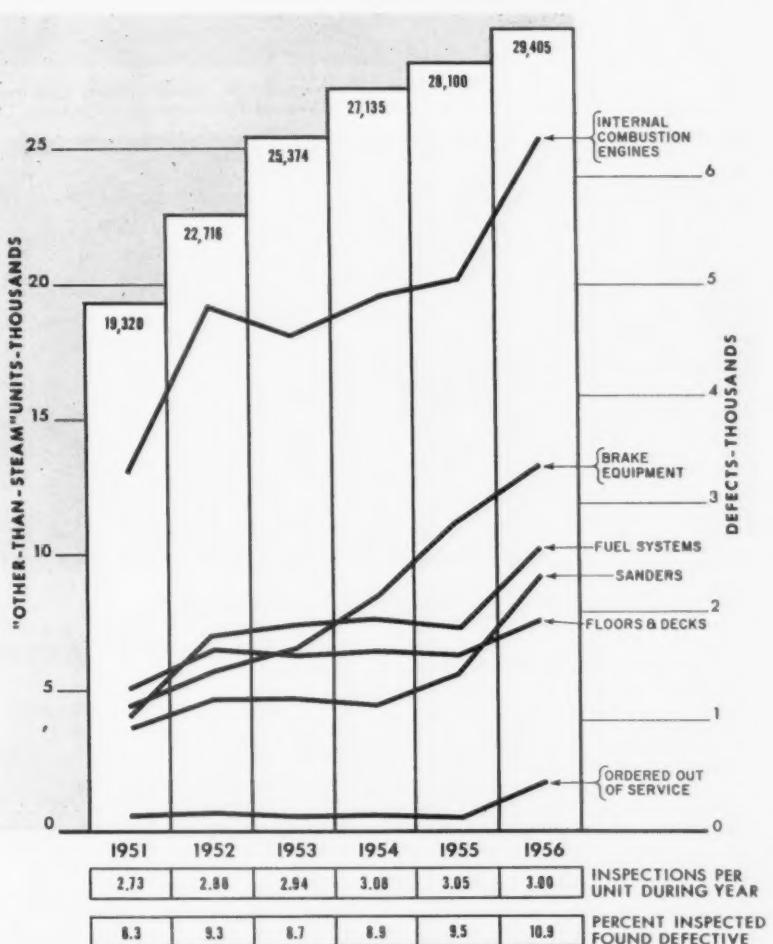
Accidents decreased 12 per cent and injuries dropped 44 per cent. A year ago a locomotive wheel failure in passenger service accounted for a large number of non-employee injuries. No such accidents occurred in the past year, and there were no injuries to non-employees.

## Inspectors' Conferences

For the past three years the number of units inspected by each inspector has remained about constant, but the director's report indicated that insufficient travel funds did not allow district inspectors to travel throughout their districts so that outlying terminals were not visited with the same frequency as in the past. This non-uniform enforcement pattern has now been

changed because additional travel funds were appropriated for fiscal 1957. "Neglected" inspection points can now be covered.

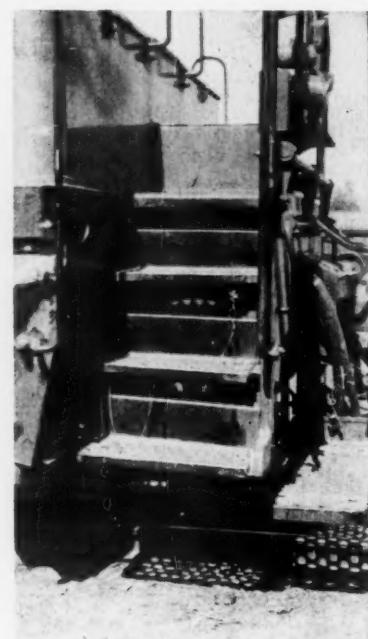
J. A. Hall, Director of Locomotive Inspection, reported that during the year conferences were held at convenient locations between offi-



Other-than-steam ownership went up little last year but defects and ordered-out-of-service figure jumped sharply upward. ICC has not been able to increase the frequency of inspections.



Broken wheel on diesel switcher started with rim defects. Tensile stresses resulting from heat ing due to brake applications set up hoop action causing rapid extension of the crack.



Steps separated from supporting attachments and wired in place caused diesel switcher unit to be ordered out of service by district inspector when condition was discovered.



Stencil mark on the inside face of the wheel rim of a diesel electric road unit was the source of a failure that then progressed through the flange and also toward the hub of the wheel.

### These Crankcase Explosions Caused Injuries

- Crankcase explosion on June 29 resulted from an overheated bearing. Water leaking at lower liner seal. Lower tangs of No. 2 main bearing sheared off which permitted bearing to rotate 90-deg shutting off oil lubrication. "No. 2 engine used 6-in. of water in 3 hours" was reported June 22. "No. 2 engine using water" was reported on June 23 and 24.
- Crankcase explosion on November 19 was caused by overheated crankshaft bearings. Filter elements were coated with heavy sludge and lubricating oil pressure regulating and relief valve was prevented from seating by particles of

flaked carbon lodged between it and the body seat.

• Crankcase explosion on October 9 resulted from an overheated bearing. One injector was defective and did not properly atomize the fuel oil. Exhaust valves of five cylinder were leaking freely and permitted unburned fuel to pass into the crankcase.

• Crankcase explosion caused by overheated main crankshaft bearings. Low oil pressure and high oil pump suction shut down switch of engine governor inoperative. No. 8 fuel injector leaked at seal ring.

• Crankcase explosion on December 20. Surface of the main part of left No. 2 piston was very rough. Cap, compression rings, upper oil ring and top oil ring on skirt were missing.

• Crankcase explosion on October 22 was caused by a defective and overheated piston. The piston had a large hole in its crown and the liner was excessively scored.

• Crankcase explosion on November 22 resulted from an overheated bearing. One or more lower liner seals were defective and the engine lubricating oil had a high percentage of water contamination.

**Where Are ICC Defects Being Found  
on Diesel and Electric Locomotives?**  
(Partial List of Defects)

	1956	1955	1954
Air compressors	443	419	326
Boilers	275	203	175
Brake equipment	3,259	2,790	2,126
Cabs and cab windows	1,600	1,073	858
Cab floors, aprons and deck plates	1,933	1,677	1,703
Controllers, relays, circuit breakers, magnet valves, and switch groups	775	802	454
Coupling and uncoupling devices	166	204	139
Draft gear	360	336	291
Driving boxes, shoes, and wedges	291	249	154
Fuel system	2,555	1,833	1,951
Gages or fittings, air	278	226	136
Handholds	258	219	230
Internal-combustion engine defects, parts and appurtenances	6,356	5,035	4,848
Jumpers and cable connectors	553	214	178
Motors and generators	1,122	880	813
Sanders	2,307	1,492	1,200
Springs and spring rigging, driving and truck	363	306	241
Steps, footboards	1,005	737	622
Trucks	1,007	1,054	503
Wheels	252	282	257

**What Do ICC Inspectors Find?**

**LOCOMOTIVES OTHER THAN STEAM**

	1956	1955	1954
Number of defects	29,054	22,618	19,640
Locomotive units reported	29,405	28,100	27,135
Locomotive units inspected	88,269	85,897	83,338
Locomotive units defective	9,597	8,129	7,395
Percentage of inspected found defective	10.9	9.5	8.9
Locomotive units ordered out of service	492	127	140

**STEAM LOCOMOTIVES**

	1956	1955	1954
Number of defects	6,487	7,350	9,763
Locomotives reported	5,875	8,892	12,135
Locomotives inspected	8,794	12,128	19,999
Locomotives defective	1,499	1,784	2,599
Percentage of inspected found defective	17.0	14.7	13.0
Locomotives ordered out of service	152	96	117

**Accidents and Casualties Caused by Failure of Locomotive Components**

Number of accidents	1956	1955	1954
	73	83	105
Killed			
Members of train crews:			
Engineers	1	19	1
Firemen	2	38	1
Brakemen	1	10	10
Conductors	8	4	4
Switchmen	2	1	4
Maintenance employees	2	18	2
Other employees	42	2	12
Nonemployees	4	42	194
Total	79	142	302
Injured			

cials of the Bureau of Locomotive Inspection and district inspectors. Policy, uniform inspection and enforcement procedures, individual inspection problems, and new locomotive designs were discussed.

All district inspectors are advised of details and causes of unusual accidents to better assist in their educational contacts with railroad personnel. Monthly current-activities bulletins covering investigations are

forwarded to district inspectors.

No carrier filed any appeal from the decision of a district inspector during the year when six cases involving 117 counts for alleged violations of the Locomotive Inspection Act were transmitted to U. S. attorneys for prosecution.

Multiple-unit electric cars were made subject to the Locomotive Inspection Act on April 1, 1956. "Rules and Instructions for Inspec-

tion and Testing of Multiple Operated Electric Locomotive Units Designed to Carry Freight and/or Passenger Traffic" have been issued. Because specifications for these m-u cars had to be filed when they were brought under jurisdiction of the Director of Locomotive Inspection, the total number of "locomotives" reported increased for the first time in many years.

The number of steam locomotives reported continued to decline rapidly. However, all four fatalities occurring on locomotives during the year were due to two steam locomotive boiler explosions. This followed the year 1955 when the director could report that for the first time since passage of the Locomotive Inspection Act there had been no boiler explosions.

The greatest number of injuries resulted from accumulations of oil on floors, decks and steps of diesel locomotives. The ICC had emphasized this a year ago when it promised a crackdown on locomotive "housekeeping". Reported in 1956 were 22 such accidents on diesels. In eleven of these, oil accumulations had been reported from 4 to 29 times prior to the accident. Failure to correct such conditions indicates a "laxity in observance of basic safety essentials," according to the director of locomotive inspection.

The report continued "Because each oil hazard is a potential source of a disabling accident, district inspectors have been instructed to give close attention to this type of defect particularly on railroads where this condition is prevalent."

Seven crankcase explosions resulted in injury to nine persons. Two of these were caused by defective pistons and the remainder were caused by overheated bearings resulting from lubrication failures. Injuries from cab seat failures dropped from eight to three last year and credit is taken for the "surveillance exercised by district inspectors."

A total of 88,269 inspections were made on the 29,405 "other-than-steam" locomotive units during the year. On these units 9,597 defects were found—10.9 per cent. Principal defect classifications in declining order were (1) internal combustion engines, (2) brake equipment, (3) fuel systems, (4) sanders, (5) cab floors, aprons and deck plates.



Two 8-ft doors on each side of CNR "all-purpose" box car cover doorways which can be 15-ft 8-in. wide. Experimental conversion was made from a standard 40-ft 6-in. box car.

## CNR Goes All Out For An All-Purpose Box Car

Seeking a real all-purpose box car, research engineers of the Canadian National Railways have spent two years designing, constructing and testing a prototype car with door openings which can be altered from 5-ft 8-in. to 15-ft 6-in.

Engineers devised several alternate designs before selecting the arrangement finally incorporated into a standard box car for the tests. North American railroads have been puzzling over box car door sizes for some years. Each shipper has his own peculiar requirements depending on the type of product or material he wants to ship. What suits the grain shipper is hopeless for the auto shipper. What the canned goods shipper wants doesn't suit the shipper of plywood.

Mechanization of loading and unloading has played a large part in these specialized requirements. The shipper using fork-lift trucks is not satisfied with a 6-ft opening, but wants a doorway that fork-lifts can enter with ease, even carrying 4-x 8-ft plywood sheets.

There are railway requirements that come into the picture. For bulk shipments, the 6-ft door is still best.

Grain, which in 1955 formed 11.9 per cent of total CNR tonnage requires that wooden grain doors be placed inside the car across the door opening to prevent leakage. CNR has an investment of \$1,500,000 in such grain doors, all designed to fit the 6-ft opening. The normal replacement rate would allow a complete change to a different size in five years, but the larger doors would cost more.

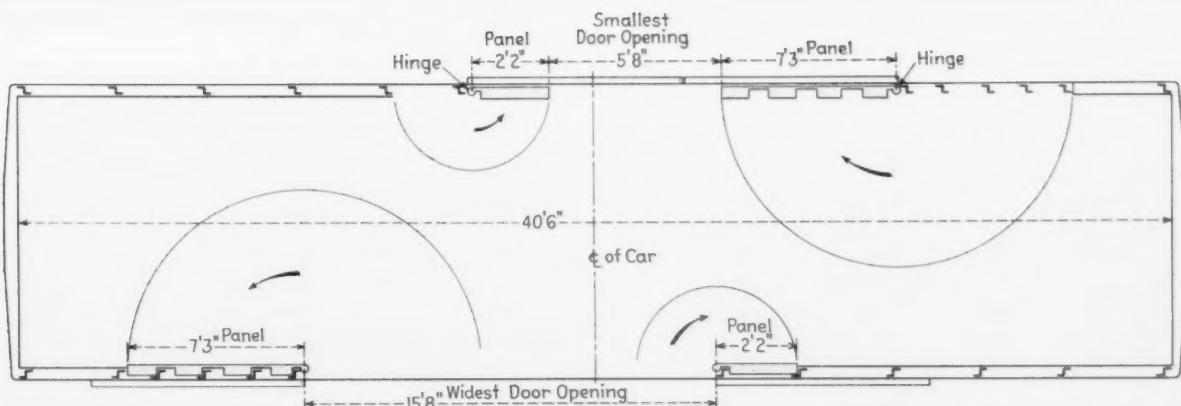
Recently the New England Shippers' Advisory Board made a survey among members to determine their preferences for the dimensions and capacity of the ideal box car. The data would be similar if it were summarizing the requirements of

Canadian merchandise shippers. An extract from this regarding door openings is shown below.

Most merchandise shippers preferred door openings at least 8-ft wide. Presumably they would be satisfied with anything wider. Some would like to have the whole car side removable.

These considerations indicated to CNR engineers a convertible car. Their first idea was a 12-ft opening with a movable post in the center. This would require the use of two 6-ft grain doors on each side of the car and would double the expense of grain doors in making the car acceptable for grain service. The double expense in grain doors along

Width of door (ft)	Preference by shippers of following number of carloads	Percentage of Preference
5	26	.2
6	1,787	17.0
7	997	9.5
8	6,218	59.1
10	1,221	11.6
12	276	2.6



Plan of "all-purpose" car shows how the two side doorway widths are produced with swinging panels. Car is being tested in services which require both side opening widths.

with the increased inventory, and the difficulty encountered in making the two sets of grain doors tight and leakproof seemed to make this design unsuitable. Removal of the movable center door post in a 12-ft opening would make the car meet the requirements of merchandise shippers. However, this car would not suit automobile shippers, because the 1957 models cannot enter through a 12-ft doorway.

Thought then turned to sliding wall panels, and plans were prepared for several variations. Panels were designed to slide on the outside of the car, to slide inside the car and to slide within the side walls. They were to be supported on rails, either at the top, or at both top and bottom. These plans were

discarded because of the complex mechanisms necessary to move and support the panels, and the difficulty in making them weathertight.

CNR engineers came to the conclusion that the simplest, most practical means of moving the panels was to hinge them. Plans for this arrangement were prepared, and a standard 40-ft 6-in. box car was remodeled with folding wall panels.

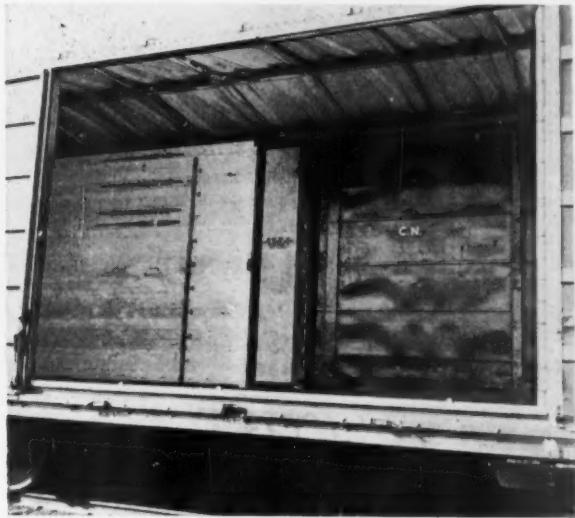
A 15-ft 6-in. door opening was made in the side and covered on the exterior by two 8-ft sliding doors. This large opening is off the center of the car—the same arrangement which is standard for auto box cars. On either side of the opening is a hinged panel—one over three times wider than the other. When they are swung to the closed posi-

tion, the small door opening is centered in the car side and is only 5-ft 8-in. which is then suitable for grain loading. Folded back, the panels recess into the car's fixed walls. They are supported on floor-to-ceiling piano hinges.

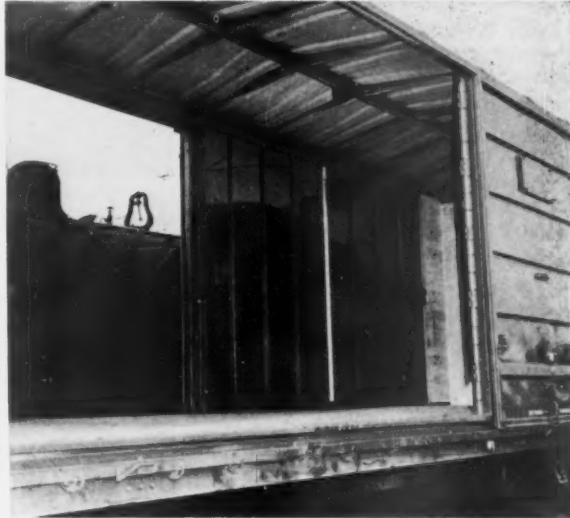
Work on the designs was started in 1955 and the prototype was completed in May, 1956. A committee of CNR traffic operating, car service and research people was set up to conduct tests with the car in different types of service.

The following shipments were chosen: china clay, grain, automobiles, lumber, newsprint, sugar in bags, woodpulp in bales, veneer, aluminum ingots and canned goods.

The first load to be placed in CNR 590575 after alterations was



Narrow 2-ft 2-in. wide plywood-faced panel folds into the car's side wall to produce wider doorway opening. Car's two side openings are staggered in automobile car style.

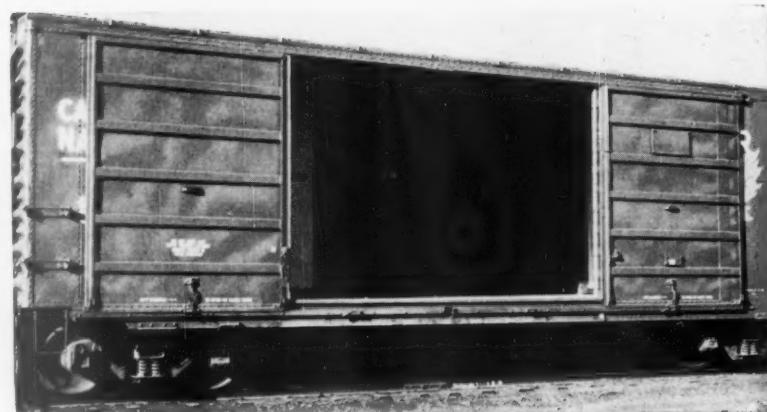


Wide panel of 7-ft 3-in. width has been swung out to give small door opening. Panel is "grooved" to fit around side posts. All panels have piano style hinges.

china clay consigned from Montreal to St. Johns, Quebec. The load arrived at its destination in good condition with bulkheads securely in place and with little leakage. The door opening for this service was closed down to 5 ft 8 in.

In December the car left Midland, Ontario, with its first load of grain for dockside in Montreal. This run was successful; the wooden grain doors remained secure throughout the trip.

The car was placed in LCL service between Montreal and Toronto in January and has been performing satisfactorily. Its next loads will be bagged goods—sugar and flour; then it will handle newsprint.



Side opening is large enough to permit use of the car in automobile service. CNR has just put into service another series of cars designed only for automobile hauling.

## Budd Lightweight Now Runs from Pittsburgh to Chicago

Budd lightweight coach, "Pioneer III" is now operating into Chicago from Pittsburgh on the Pennsylvania. This car is the prototype for cars, now ordered, which will eventually be used in Pennsy's electric m-u operations (see Railway Locomotives and Cars, February, 1957, page 12).

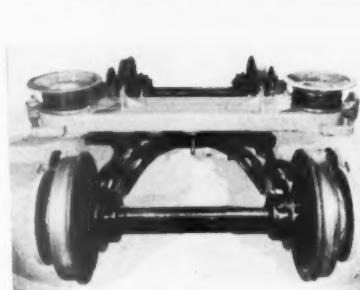
Since the first public announcement last summer, the "Pioneer III" has been operating between Washington and New York as part of the regular consist of the Pennsylvania's tubular "Keystone" trains. During these runs the car accumulated over 55,000 miles of operation, but did not carry passengers because it was always separated from the regular passenger cars of the "Keystone" by the train's power car.

Tests have shown that the radical Budd truck provides riding qualities equivalent to the newest standard coaches on the Pennsylvania, and the noise levels on both types of cars are equal. Road testing has confirmed the theoretical calculations of Franklin Institute's analog computer on ride characteristics.

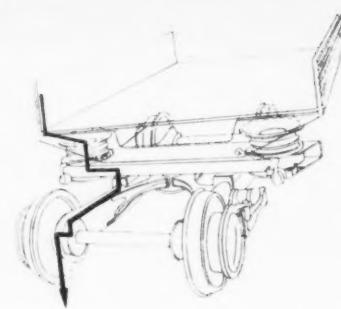
Complete inspection after over 50,000 miles of running showed negligible flange and tread wear. Only a few changes to simplify inspection and servicing were made before the car went back on the road to accumulate more mileage—now from Pittsburgh to Chicago.



"Pioneer III" was hauled between PRR GG-1 and tubular power car of "Keystone" to accumulate mileage between New York and Washington.



Budd truck has air springs and total weight of 6,600 lb.



Load paths do not go through the center plate; simplify structure.

# 1957 Interchange Rules Have Changed

A smaller book of Interchange Rules and simplification of billing may be the next important advances in interchange—the field which is of uppermost concern to all railroad car departments and private car line operators. An AAR representative recently told of the work of an AAR committee which is studying the simplification of interline billing. It is intended to eventually reduce the coupler prices now listed in the interchange rules down to four or five. Journal box lid prices would be averaged to produce one price for 9-in. lids, one for 10-in. lids, etc. Changes such as this, and other revisions, should cut the present rule book from its 400 pages to about 250 pages. One result should be to make it possible to develop a billing clerk "in six months instead of six years."

The annual review of the interchange rules revisions was presented to the Eastern Car Foreman's Association at the February 8th meeting by L. T. Donovan, Assistant to Executive Vice Chairman, AAR. The New York group has made this summary of rule changes a regular part of its yearly program for many years. Mr. Donovan called attention to "a number of very important changes and additions." Labor and material charges have continued to rise and have a bearing on much of the interline billing. Committees of the AAR Mechanical Division have revised specifications and diagrams and these activities have resulted in minor changes in some rules.

Mr. Donovan discussed the development of the Interchange Rules from the first agreements made during the 1860's when railroads first began to interchange cars. He predicted some probable changes to be made in the present rules, and indicated those changes which have been made and which are considered of particular importance. These important items are marked by bold squares ■.

## Rule 2

■ **Section (b)** was modified to indicate that further information on the handling of leaking tank cars is con-

tained in Bureau of Explosives Pamphlet No. 22.

**Section (d-1, -2, -3)** was changed to provide that restrictions on acceptance of refrigerator cars equipped with portable or permanent heaters in interchange would be applicable to any car with such heaters.

■ **Section (e)** (new) was added to cover mechanical refrigerator cars with mechanical units not operating, or not operating properly, to indicate that handling must comply with National Perishable Freight Committee Circular 20-D, Rule 222-A. Former Paragraph (d-4) became Paragraph (e-2) and former sections (e) to (j) were relettered (f) to (k).

■ **Section (h-4)** modified to provide that health benefit expenses would be applicable to bills covering work in transfer or adjustment of lading.

## Rule 3

**Section (a-5)** modified to permit the use of extra heavy nipples at angle cocks when desired.

**Section (r-8)** had Note 1 modified to permit substitution of wood in place of metal for dome platforms and dome steps of tank cars carrying corrosive commodities, and had Note 2 modified to provide additional approved types of metal running boards.

■ **Interpretation 1** was revised to conform with AAR Tank Car Specification and ICC regulations.

*Effective January 1, 1957,* the following became mandatory:

**Section (b-7)** requiring metal brake lever badge plates on all cars from owners.

**Section (g) (new)** added to require that all new box cars will have floorings with minimum thickness of  $2\frac{3}{8}$ -in., and at least three 6.7-lb Z-section floor stringers (or equivalent) on each side of the center sill.

**Section (t-3-b)** prohibiting cast steel truck side frames having I, T, or L section compression or tension members under all cars in interchange service.

*Effective August 1, 1957,* the following will be effective:

■ **Section (j-3)** requiring approved journal lubricators on all plain bearing cars built new, rebuilt, or re-

ceiving heavy repairs. Requirement will be effective on all cars in interchange on January 1, 1960.

**Section (s-3)** requiring that automatic slack adjusters on cars must be AAR approved (date extended from January 1, 1957).

*Effective dates* for following sections have been extended one year to January 1, 1958.

**Section (f-3)** requiring lading strap anchors on flat cars.

**Section (w-4)** prohibiting cast iron wheels under 70-ton covered hopper cars.

The following will become effective on January 1, 1958:

**Section (r-5)** requiring the use of non-combustible insulation in new and rebuilt refrigerator cars.

**Section (t-2-a, -b, -c)** requiring the use of approved designs of truck side frames on new cars.

■ **Section (w-5)** prohibiting the use of cast iron wheels on cars built new or rebuilt.

## Rule 4

**Section (f-3)** modified to permit the application of 2-in. load securement bands.

## Rule 17

**Section (e), Note 3** has had the third paragraph modified to indicate only scrap credit is to be allowed for chair castings removed in connection with exchange of No. 18 brake beams.

**Section (i)** modified to include new types of approved draft gears.

■ **Section (r)** permits substitution of any approved design of metal running board or brake step, where suitable.

**Interpretation M-13** was added in order to establish a uniform method of preparing billing for repairs made to mechanical refrigerator cars and for the disposition to be made of parts removed.

## Rule 24

The entire rule has been modified and a new **Figure 4** added to permit application of liners to the worn ceiling of journal boxes.



Handling in event of failure under load, procedure for billing and handling of repair parts, and a specification of the proper diesel fuel all had to be added to the Interchange

#### Rule 28

This is a new rule added to specify the proper diesel fuel for use in mechanical refrigeration units to prevent failures. Fuel oil called for is an ASTM 1-D fuel, and "some grades of kerosene will comply with these specifications."

#### Rule 32

■ **Section (12-b) Note 2** was modified to indicate that a change is permissible on actual cost basis for elimination of contamination by washing, steaming, sanding, etc.

#### Rule 60

**Section (n), Note 1** (new) was relocated from **Section K** to clearly indicate that provisions contained therein on stenciling after brake tests are applicable to all types of air brakes.

**Section (1) Note 8** (new) was added to insure cleaning of brake cylinder release valve when brakes are C.O.T and S.

#### Rule 61

**Paragraph (c)** was modified to insure proper cleaning and lubrication of center plates in accordance with intent of the rule.

#### Rule 63

**Paragraphs 3 and 4** were modified, to reduce the permissible wear on brake hanger and brake connection pins.

Rules because there are now more than 2,000 mechanical reefers in service such as this New York Central car completed last year.

#### Rule 64

Second paragraph modified to require the use of nut locks, lock nuts or unit nuts for securing certain air brake parts to car.

#### Rule 66

**Paragraph (c)** pertaining to repack markings was modified to clarify the intent.

■ **Interpretation No. 4** had the third note modified to permit certain applications and clarify the intent of existing notes pertaining to packing retainer devices. New fifth note added to provide for a newly approved design of packing retainer device.

#### Rule 67

■ This rule was changed with regard to the height of body or truck above top of rail to provide proper clearance over car retarders and other devices.

#### Rule 70

■ Modifications made throughout the rule because the new Types A and B cast-steel wheels have been adopted as AAR Standard. Similar changes were made in Rules 76, 82, 93 and 101 (Items 193-A and 193-B).

#### Rule 75

**Paragraph (d)** was added to more clearly indicate that built up tread on wrought steel wheels is an own-

er's responsibility and a defect for which wheels may be removed from service.

#### Rule 85

■ Second paragraph was modified to clarify the intent as to responsibility for roller bearing units including axles. Third paragraph was added to provide for removal of axles having flaws detected by Ultrasonic Reflectoscope when verified by further inspection or tests.

#### Rule 86

The Table of Journal Diameter Dimensions for Controlled Bearing Clearances had the note following modified to clarify the intent.

#### Rule 93

First requirement of third paragraph modified to eliminate the necessity for showing totals for each month's billing separately when no price changes are involved.

#### Rule 96

This was modified to permit a method of group billing for roads desiring to use it in the interest of simplification.

#### Rule 98

■ **Paragraph (8) (new)** added to expedite the removal of cast-iron wheels from 70-ton covered hopper cars without undue expense to foreign roads which are obliged to handle these cars.

#### Rule 101

■ A number of price changes have been made because of material quotations and the increase in labor rates from \$3.80 to \$4.05 an hour which affected all combination labor and material items. Changes were made in several sections dealing with items recently given approval or now obsolete. These include dirt collector and cut out cock, pipe fittings, cast-steel wheels, brake beams, draft gears, hand brakes, journal box lids, brake beam safety supports, and packing retainers.

■ **Items 119 to 125** had new note added to indicate that the price shown includes coupler equipped

with E-24-A bottom rotary lock lift. When coupler applied is equipped with E-6-A top lock lifter or E-14-A bottom lock lifter, the price must be reduced by a specified amount.

**Items 136 to 136-G.** New items and note added in table form to provide allowances for Type E coupler parts.

**Item 193** modified to indicate it refers to Davis cast-steel wheel.

#### Rule 107

All combination labor and material items modified account recent increase in labor rates.

**Item 2** new note following added to establish uniform method of billing for repairs to mechanical refrigeration units and disposition of parts removed.

**Item 45** modified to permit additional charges for necessary pipe connections.

**Item 78** second note following modified to indicate charge also applies to floor protection plate bolts which do not secure flooring to car.

**Item 156** new first note added to provide extra labor allowances where packaged type springs are involved.

**Item 168** new last note added to provide additional labor charge for changing wheels where journal boxes are equipped with R-S journal stops.

**Interpretation No. 12** was modified to clarify the intent as to disposition to be made for overlap labor charges for repairs made in cases of divided responsibility.

#### Rule 108

**Section (B) Item 7** was modified to permit charge for labor and material involved when seal hook, pin or chain (any or all) is welded to car.

#### Rule 111

All combination labor and material items modified account recent increase in labor rates and material prices.

#### Rule 112

**■ Section B** per pound prices in tables under Paragraph (1) and (9) modified with new per pound prices

incorporated in Paragraph (9) for insulated tank cars. Paragraph (5) modified to provide basis for settlement of mechanical refrigerator cars equipped with beef rails, as shown in Supplement No. 1 to the 1956 Code. New Note (4) added to provide settlement basis for outside heater coils applied to tank shell of tank car by fusion welding. Paragraph (10)(c) of Section B modified to provide for additional allowances for roller bearing assemblies in settlement for destroyed cars. This paragraph further modified to provide additional allowances for AAR cast-steel wheels.

**■ Sections (E), (F), (G) and (H)** modified to harmonize with ICC Regulations as modified effective January 1, 1955 with some sections expanded and some paragraphs relocated to develop proper sequence and to more clearly indicate the intent.

#### PASSENGER CAR RULES

#### Rule 2

**■ Section (j)** was modified by ex-

tending effective date to January 1, 1958, in order to prevent hardships on roads which have not completed program of replacement of Pitt type couplers.

#### Rule 7

**Section (e-4)** was modified to clarify the intent of responsibility for failure of roller bearing units including axle.

#### Rule 21

All combination labor and material items were modified because of recent increase in labor rates. **Item 27** was modified to clarify the intent regarding charges for roller bearing units disassembled and assembled.

#### Rule 22

All combination labor and material items modified because of recent increase in labor rates. Other items modified account increase in material prices. **Item 51** was eliminated because 36-in. cast-iron wheels are no longer being manufactured.



**Seaboard Has "Tarp-Topped" Gondola**

To provide for rapid loading and unloading of sheet steel, the Seaboard has equipped one of its 50-ton, low-side gondolas with a special cover of heavy rubberized fabric sup-

ported by metal hoops. This cover is hand-cranked back and forth over the cargo space. Cover was designed by the American Forge & Manufacturing Co.

# Subway Air Conditioning Gets Green Light

*H & M made two test installations to find the answers from operating and passenger standpoint*

A recent joint purchase by the Pennsylvania and Hudson & Manhattan railroads will put fifty new air-conditioned cars into rapid transit service between New York City and the New Jersey cities of Newark, Hoboken and Jersey City.

Last summer H&M made installations to determine the feasibility of air conditioning rapid transit cars in subway service. This was an effort to see what could be done to increase summer passenger comfort and to win back operating revenue lost to bus transportation and parking facilities.

Late-summer operation indicated that air conditioning of transit equipment was practical. Two companies were asked to submit designs—the Trane Company and Safety Industries. Both systems are true air conditioners. Each has a compressor, evaporator, and a duct system; the recirculation of existing air had proven ineffective in the past.

Two cars, at the time of their regular periodic overhaul, were fitted with this experimental equipment. No. 438 was equipped by Trane and No. 439 by Safety.

Several problems had to be solved. The car had to adjust itself to both constant and rapidly changing occupancy and at the same time provide uninterrupted cooling while idling or operating at low speeds. The following are descriptions of these two trial cars as they now exist.

**Car No. 438 (Trane).** Designed by Pullman-Standard and engineered by Trane, this system meets the demands of peak, rush hour loads by teaming up a cooling unit with an undercar compressor-condenser. The cooler has a direct expansion refrigerant coil feeding a series of fans.

In operation the system is started by a manual fan switch. When car temperature exceeds 76 deg F, the

thermostatically controlled unit goes on and the recirculating fans run at a minimum speed. Car temperature controls the fan speed from a minimum speed at 76 deg F to a maximum at 82 deg F.

Outside air is chilled. Circulation begins as the centrifugal fans draw outside air through louvers set flush in the exterior car frame. These pull a constant volume of outside air—1500 cfm—into the car. Immediately upon intake, the air is filtered and enters the fan plenum chamber. From here the air passes over the evaporator coil and is chilled to a predetermined temperature. This chilling results in maximum dehumidification, keeping the humidity at a comfortable level even when the car is fully loaded.

Conditioned air is distributed the length of the car by two ducts. Recirculating fans draw the conditioned air from the supply ducts through inlets into a central chamber. At the same time recirculated air is being drawn through the ceiling grilles located between the fans. The two air streams are thoroughly mixed by the fan blades before entering the car.

Each of the five fans will handle a maximum of 1,000 cfm. . . . 250 cubic feet of conditioned air and 750 cubic feet of recirculated air. At maximum speed, a total of 5,000 cfm of air is discharged from the fans.

The undercar compressor-condenser unit consists of an angle frame on which is mounted a 7-ton, compressor, a condensing coil and a 10 hp d-c motor with a double extended shaft which drives the compressor and an axial type condenser fan. Included in this assembly are the liquid receiver, strainer, and refrigerant valves.

The overhead cooling unit is a blow-through type with two eight in., single width, centrifugal fans, directly driven by a  $\frac{3}{4}$  hp, 1850

rpm fan motor. A special high capacity, direct expansion, refrigerant coil supplies the cooling. An insulated double drain pan provides positive condensate drainage.

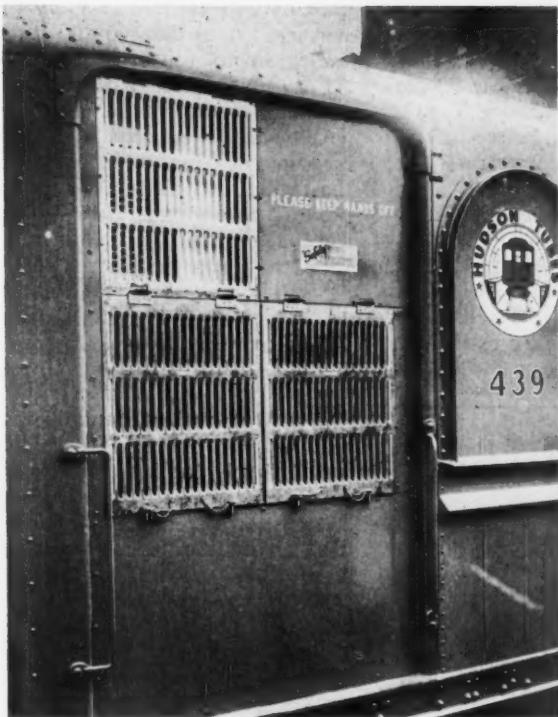
**Car No. 439 (Safety Industries).** The air conditioning equipment on car No. 439 was designed and built by Safety Industries, formerly the Safety Car Heating and Lighting Co. No. 439 was equipped with a packaged air conditioner rated at eight tons under A.S.R.E. conditions. In operation it has developed as high as 10 tons of cooling. All components are assembled, piped and wired in the package. The motor compressor, using a Safety 600 volt railway motor, drives a Carrier Type 5F40 compressor, and is mounted in the lower section of the unit.

The floor under the unit has been cut out for the condenser air discharge. The condenser coil is housed above the motor compressor unit. Over this is the evaporator section with two centrifugal pull-through blowers feeding a common-center, ceiling mounted, supply duct running the length of the car.

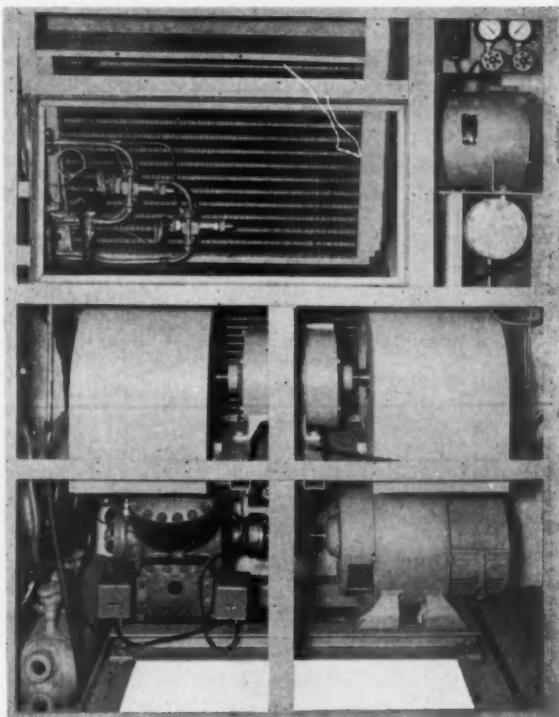
Two rows of air distributors direct the conditioned air. The return air grille is located on the air conditioning unit on the side facing the



Original equipment before any air conditioning had been considered.



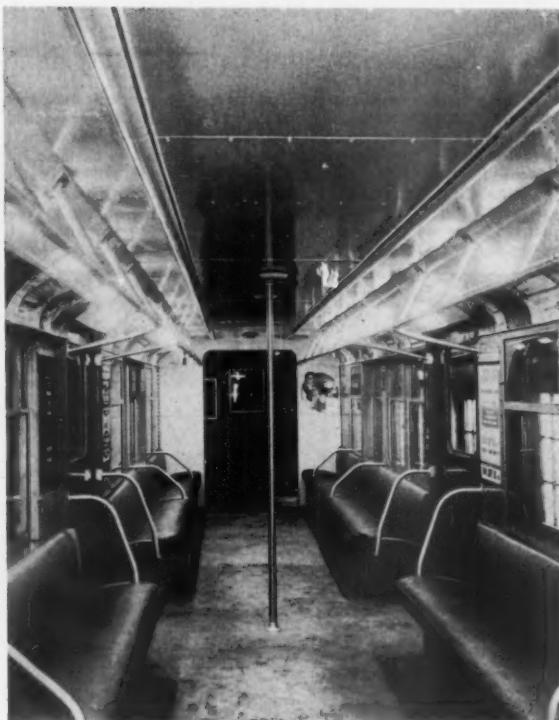
Safety Industries modified one side of the vestibule to accommodate the condenser and fresh air intake grilles.



An interior view of the safety equipment with the cover panel removed illustrates the components in a package.



Boxed recirculating air fans and the intake grilles between them show the Trane approach to the railroad specification.



Safety's idea is two parallel strips running the length of the car. These are the air distributors of the system.

aisle. Twenty-five per cent fresh air from outside the car is mixed with the recirculated air before passing through the evaporator. Condensate collects in a drip pan and is directed to an opening at the bottom of the unit by a hose.

Both the evaporator and the condenser blower are driven by 600 volt railway type motors. The Vapor Heating Corp. supplies the thermostatic and heat controls included in this design.

Tests were run early in August,

during the late morning and the early afternoon while the cars were stored outdoors. On August 10th, the outdoor temperature was 93 deg F (dry bulb) and 75 deg F (wet bulb). Inside the car, before turning on the unit, the temperature was 110 deg F (dry bulb) and 79 deg F (wet bulb). Twenty minutes later the temperature was down to 76 deg F (dry bulb) and 62 deg F (wet bulb). This would indicate that a unit of this capacity is needed to pre-cool the cars within a reasonable

time. Actual ambient temperatures encountered in the subway tunnel during August run between 80 and 85 deg F when it may be 90 deg F, or more, on the outside.

The highest temperatures were measured at station stops. Although the recirculated air intake was opposite a door normally open at the stops, the car interior temperature varied only plus or minus two degrees from the preset temperature of 74 deg F. This was the case throughout the rush hour period when 100 to 125 passengers occupied the car.

If it is cooler in or outside the tunnels, or if the train is running with only a few people, cooling capacity reduction is obtained by cutting out half of the evaporator coil. The four cylinder compressor immediately unloads its cylinders until the capacity of the compressor balances the load on the evaporator. The proper cooling capacity is automatically provided, resulting in positive temperature and humidity control. The evaporator blower runs continuously furnishing 3000 cfm of cooled, dried, filtered air to the car.

The new cars will have the latest type of air-conditioning equipment which, in addition to circulating thermostatically controlled filtered fresh air cooled in the summer and warm air in the winter, will also eject a sheet of cooled air across all doorways in the summer in order to prevent the entrance of the hotter outside air. The high-tensile, light-weight welded steel car bodies will be mounted on trucks equipped with four 100 hp motors driving silent, automotive-type, hypoid gears running in oil to permit faster operation and reduce vibration and noise.

Pastel hues and modern lighting fixtures in car interiors with 48 seats upholstered with foam plastic will be introduced. The insulated floors will be covered with vinyl asbestos tile to reduce vibration and noise. There will be permanently sealed, safety glass picture windows.

The new cars will be 51 ft long, three feet longer than the present ones and are to replace equipment which is mostly 44 to 45 years old, although a few are 29 years old.

An air-conditioning system, similar in principle to the Safety installation on original test cars, has been selected for cars on order.

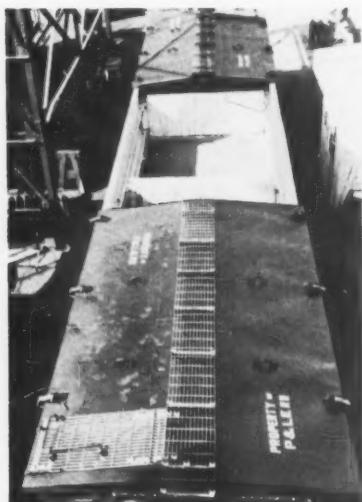


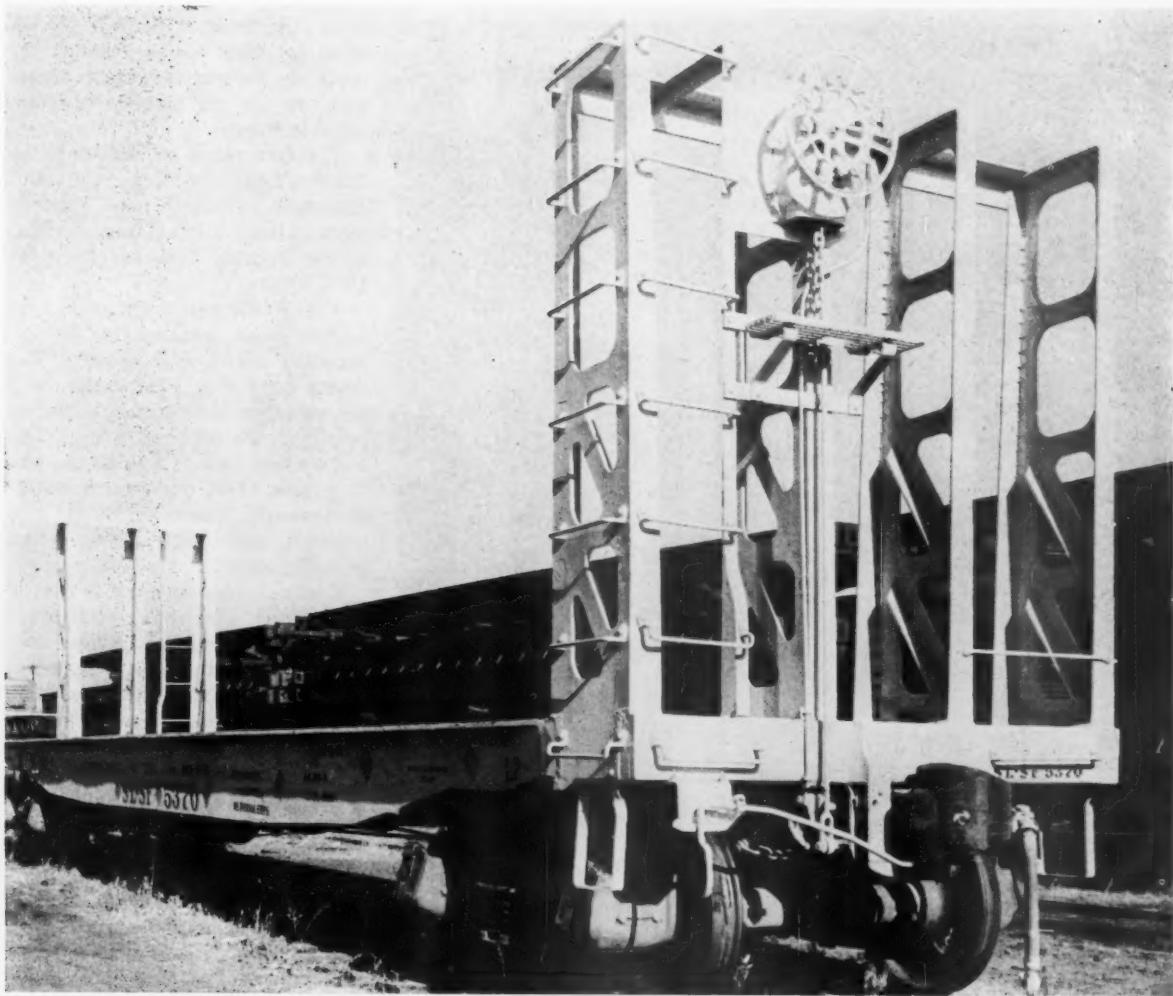
### Roofed Gondola Handles Steel Shipments

Three removable roof sections and moveable bulkheads have been installed in a Pittsburgh & Lake Erie gondola car. One of the road's 52-ft 6-in. fixed-end cars with a wood floor was used.

Designed by the P&LE's mechanical department with the cooperation of steel shippers, this car was first intended to handle

polished steel bars. Since going into service, it has been found to be very well adapted to handling tin plate and mill products; seems destined to be an important factor in the shipping of all types of steel and even other commodities. Roof sections are handled by overhead cranes which do the loading and unloading.





Underframe is one-piece cast steel in Frisco's new 70-ton pulpwood car.

### Pulpwood Cars Have

## One-Piece Cast-Steel Underframes

*Cars with 30-cord capacity are 20 per cent shorter, occupy less track, and help reduce switching costs*

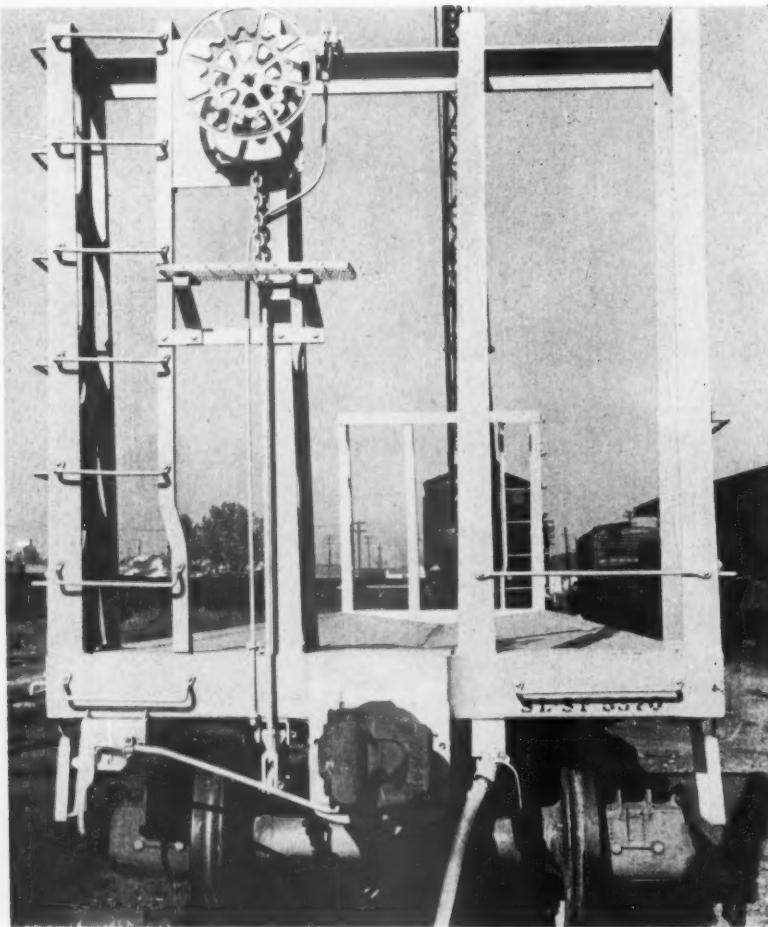
The Frisco is now assembling 150 of the new design 70-ton pulpwood cars with one-piece Commonwealth cast-steel underframes and interlocking upright bulkheads at the Yale, Tenn., car shops.

General Steel Castings Corporation developed this design after several railroads indicated an interest in a 70-ton car because of the present use of collecting points by

the paper companies. The pulpwood logs are gathered from the field and moved to central storage yard for transfer to pulpwood cars. The basic principles of General Steel's original car, introduced in 1950, of which several thousand have been built, are incorporated in this new design. They provide for a corrosion-resistant, one-piece cast steel underframe, interlocking end posts, low

side sill height for easy loading from trucks, and car floor sloped toward center of car. Automatic wedging action has been provided by making the distance between the upright end posts greater at the top than at the bottom.

Cored openings are placed in the top of the box-section center sill for drainage and exit of loose bark from the empty car to provide a clean



Open bulkhead allow clear vision. Sloping deck is for quick drainage.

**Principal Dimensions of Frisco 70-ton Pulpwood Cars**

Inside length, top, ft-in	45-6
Inside length, bottom, ft-in	45-0
Length over strikers, ft-in	50-3½
Length over truck centers, ft-in	39-3½
Width, ft-in	8-8
Height, end posts, ft-in	8-6
Height from rail to side of car, ft-in	4-0½
Capacity, lb	140,000
Capacity, based on 5-ft. logs	30 cords

floor. The ends of the car are left open for clear vision through the posts so machine and crane operators can see the position of pulpwood in the car.

The floor plates are welded to the center sill and side sill by continuous automatic welding. One hundred more of these cars will be assembled at the Frisco's Yale car shops in 1957.

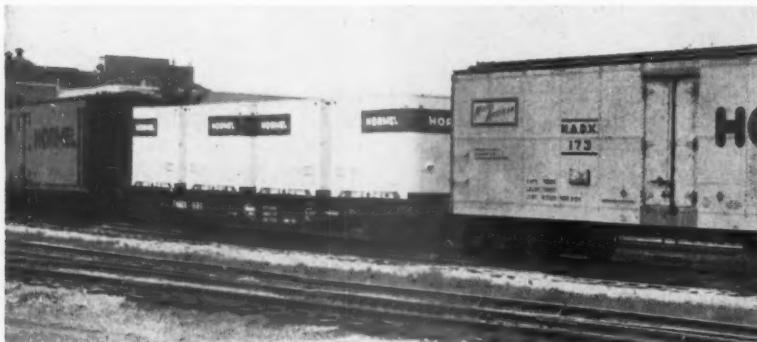
The 70-ton car is equipped with Barber S-2A trucks, with 2½-in. standard travel coil springs. The trucks have 6 x 11 journals, R-S journal stops and Magnus broached bearings with depressed backs. The truck wheel base is 5 ft 10 in., and they have 33-in. one-wear wrought-steel wheels. There are Stucki side bearings, and Davis brake beams with Diamond "S" type brake shoes.

Cardwell-Westinghouse NY-11-F draft gear is used with type E couplers, Standard railway coupler centering device with height adjustment, and Y-40 vertical coupler yokes.

The cars utilize New York air brake, schedule AB-10 brake equipment, with brake cylinder release valve, type QRR. Also included is the Amweld slack adjuster and Ajax non-spin hand brake.

Frisco officials expect only normal maintenance on the trucks, draft gear, couplers and safety appliances, and no maintenance on the cast-steel underframe and end posts, other than wreck or fire damage. They do not believe rusting will be a major factor since, as the manufacturer points out from years of service experience, the underframe and posts are highly resistant to corrosion.

The Frisco is the first of four railroads ordering this new 70-ton design and a total of over 1,200 cars are on order at the present.



**NADX "Mobile Reefer" Handles Perishable LCL**

"Mobile Reefer", a refrigerated LCL system developed by North American Car co-operating with Geo. A. Hormel and Clark Equipment, has completed 90 days of successful service between Austin, Minn. and Chicago. Four dry-ice refrigerated containers are handled on and off the NADX flat with a fork lift truck. Latching and anchoring is automatic.

Car has wheel-driven generator for circulating fans and also standby receptacles. Reelites hold the connections for each container.

HOW TO

# Learn About Air Brakes

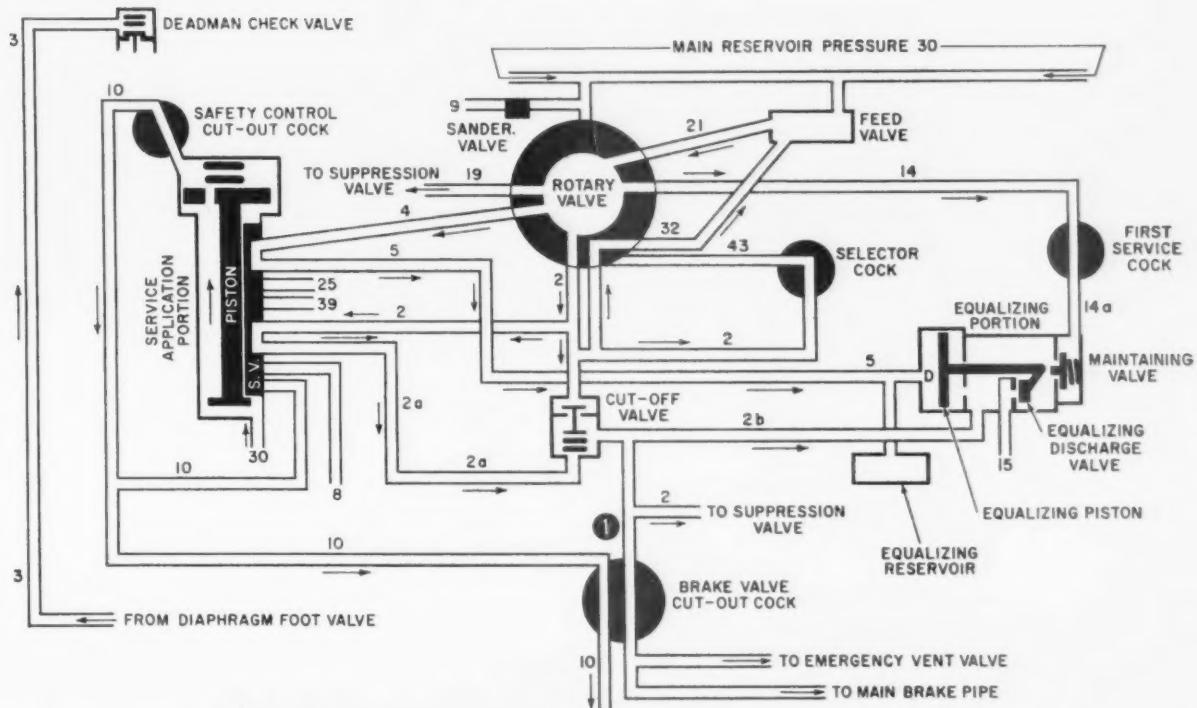
... AND HAVE FUN DOING IT

24-RL Automatic Brake Valves

Installment 1D

## D-24-MC Pressure Maintaining Brake Valve

This is the fourth installment on the 24-RL Equipment in the Air Brake in Color Schematics series. For the 1C installment see page 71 of the September 1956 issue.



Schematic, Running Position

**Main Reservoir Pressure (DS-24-H brake valve schematic in Running position).** With a carmine pencil color passage 30 to the circle marked Rotary Valve, to the rectangular block marked Feed Valve,

and to the sander valve. With carmine dashes continue in passage 9, leading out of the sander valve, and start at connection 30 at the bottom of the service application portion, all around the piston and slide valve,

including the long, narrow strip between the slide valve and piston. Color on through the port in the piston head and the chamber above the piston and into passage 10.

Carry carmine through the safety

control cut-out cock, down passage 10 through the brake valve cut-out valve (cock) to the safety control system not shown. Be sure to include the short branch from passage 10 to the slide valve (SV). Passage 3 is connected to pipe 10 by a cut-off valve in the Relayair valve unit (not shown). Show this passage in carmine and include the chamber above the deadman check valve.

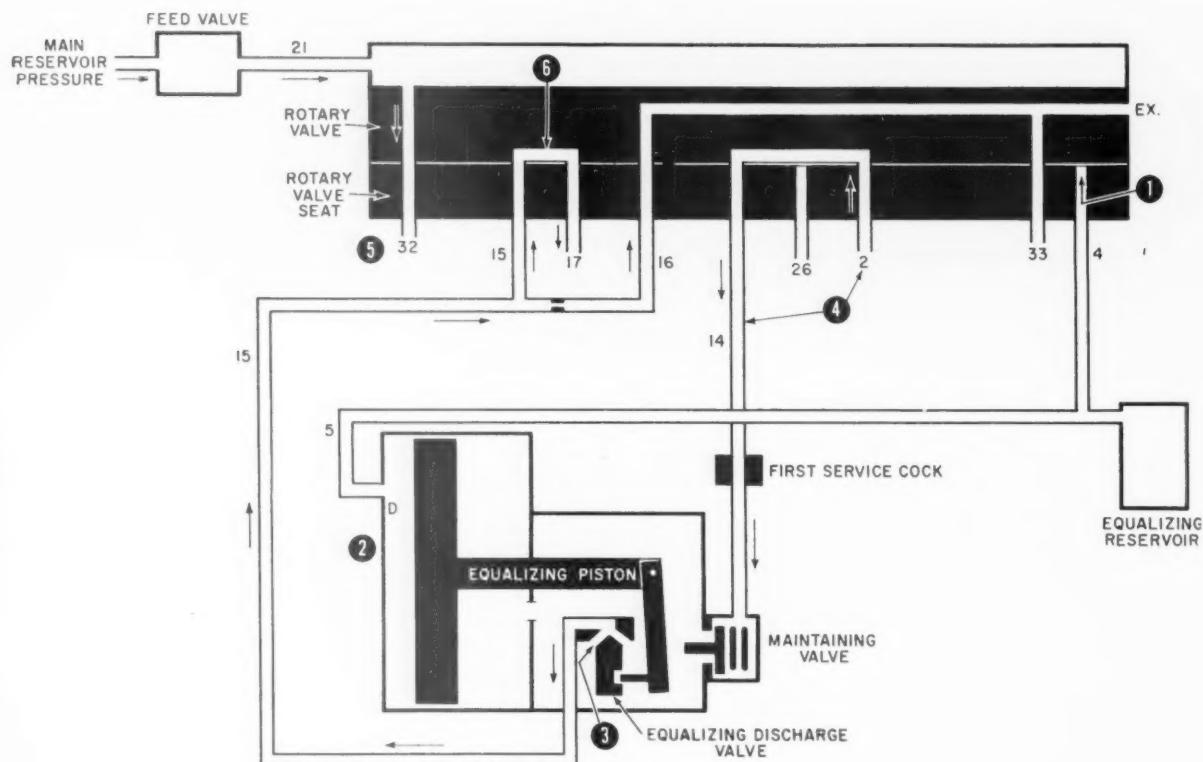
**Feed Valve Pressure.** With the orange pencil fill passage 21 and include the inner circle marked Rotary Valve. Continue the orange into passage 19 which leads to the suppression valve and passage 14

through the first service cock, passage 14a and the chamber to the right of the maintaining valve in the equalizing portion. Again with carmine, color connection 39 at the service application portion slide valve and in dashes color 25 and 8.

**Equalizing Reservoir Pressure.** With light green and starting where passage 4 connects to the rotary valve, color passage 4 through the slide valve, passage 5 and the chamber at the left of the equalizing piston.

**Brake Pipe Pressure.** With yellow and starting at the point where passage 2 connects to the rotary valve,

color passage 2 through the slide valve, passage 2a through the cut-off valve, passage 2 to the selector cock and through the selector cock into passage 43 which is blanked at the rotary valve. Continue in yellow passage 32 to the feed valve, passage 2 from the right side of the cut-off valve, branch to the suppression valve, through the brake valve cut-out to the main brake pipe. Make certain you have included the branch emergency vent valve. Color passage 2b to the right side of the equalizing piston and all of the space at the right of the piston. In yellow, color passage 15.



#### Automatic Service, Lap Position

1. The preliminary exhaust is blanked by the rotary valve.
2. There is no further reduction of equalizing reservoir pressure in chamber D.
3. The brake-pipe air continues to flow to EX by way of pas-

sages 15 and 16 until slightly less pressure exists on the brake-pipe side of the piston than that on the equalizing reservoir side.

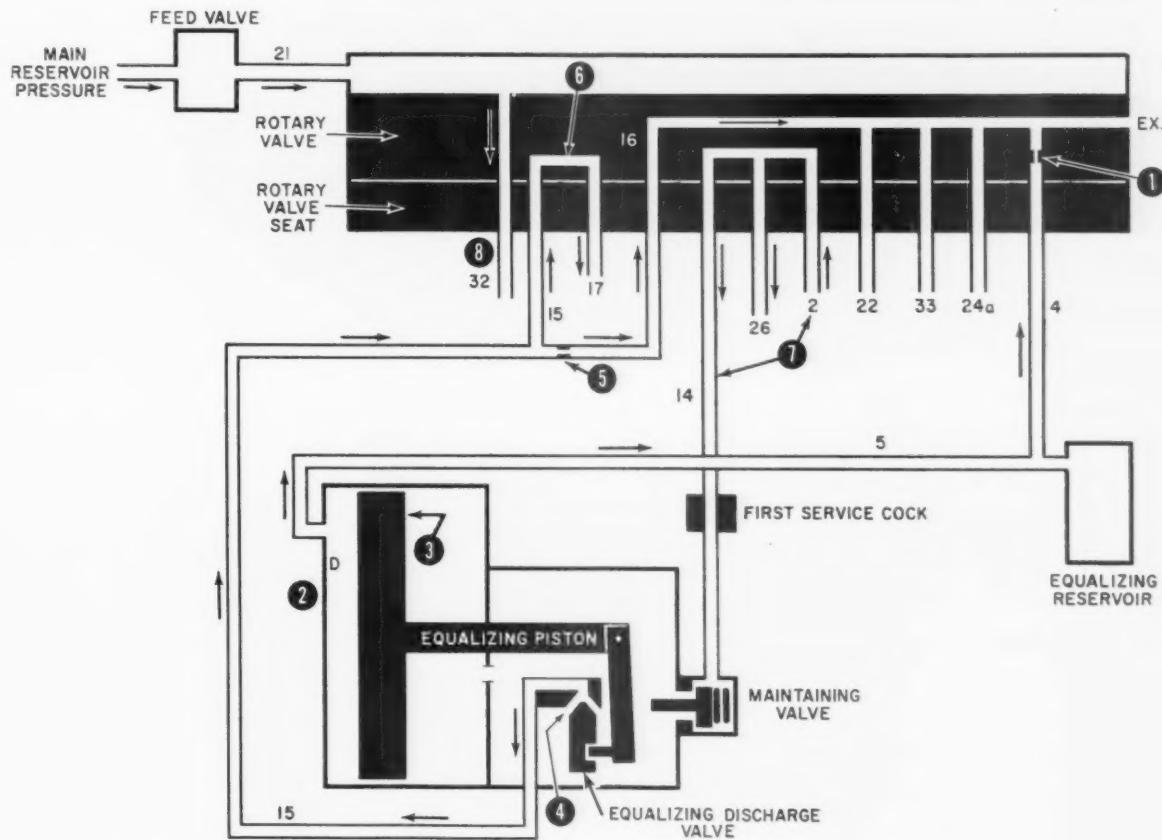
4. This indicates brake-pipe air from passage 2 to passage

- 14 to the maintaining valve.
5. Feed-valve air in passage 32 flows to the feed-valve control chamber.
6. The exhaust passage 15 is connected to the suppression passage 77.

**Automatic Service Lap Position.** In carmine, color the short passage marked MR to the feed valve. With an orange pencil, follow passage 21 out of the feed valve, filling the

space above the rotary valve and passage 32. Again with yellow, color as you did in *Automatic Service* except for passage 26, which is blanked at the rotary valve. Similarly,

apply light green as you did in *Automatic Service*, except for passage 4 to EX, which also is blanked at the rotary valve.



#### Schematic, Automatic Service Position

1. Equalizing reservoir air passes through the preliminary exhaust choke to EX.
2. Air is reduced in chamber D, to the left of the equalizing piston.
3. The higher brake pipe pressure moves the piston to the left.
4. The equalizing discharge valve is unseated, connecting brake-pipe air to passage 15.
5. This flow of air continues from passage 15 through the choke to passage 16 and then to EX.
6. This indicates passage 15 to passage 17. Suppression results if it is used.
7. This indicates passage 2 to passage 26 (suppression), and on to passage 14 to the maintaining valve.
8. Feed-valve air in passage 32 passes to the feed-valve control chamber.

**Automatic Service Position.** With a carmine pencil color the short passage (MR) to the feed valve. With the orange pencil color passage 21 out of the feed valve, the space over the rotary valve and passage 32. Passage 32 at this time supplies feed valve air to the feed valve control chamber.

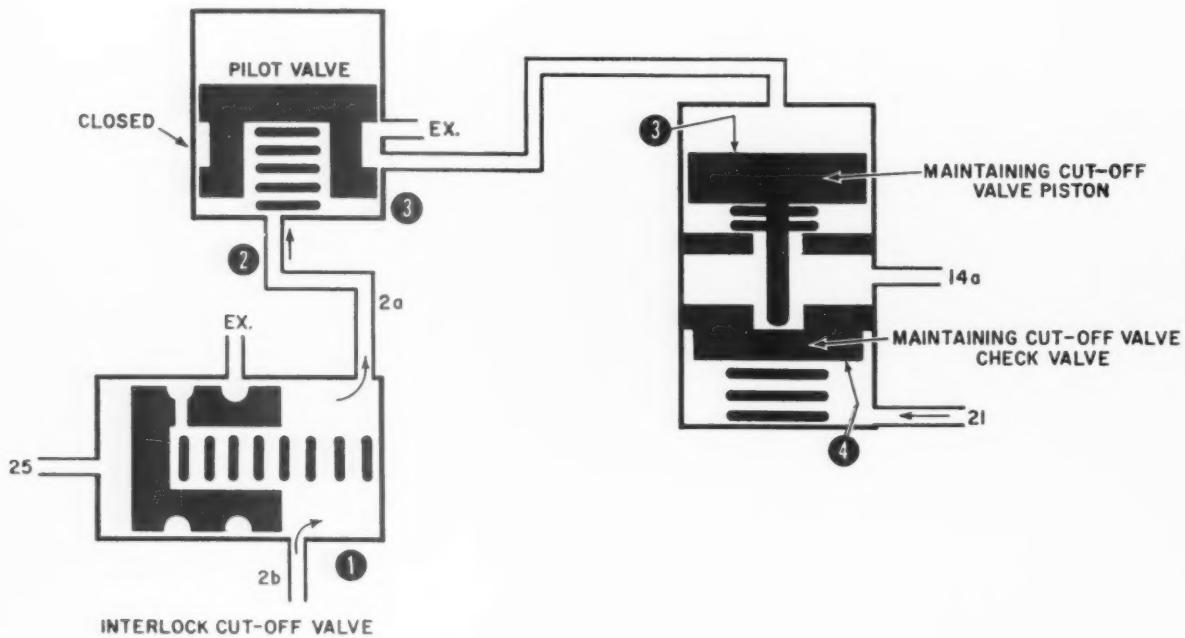
Now color in yellow the space at the right of the equalizing piston and through a passage to the section containing the equalizing discharge valve. Fill this section and into passage 15, through the rotary valve seat, the cavity in the rotary valve,

and stop where passage 17 contacts the rotary valve. Proceeding with yellow along passage 15, go through a choke into passage 16, extending the color to the exhaust passage. Place yellow dashes in the exhaust cavity to EX. Again in solid yellow, color passage 2 through the rotary valve and seat, passage 14, the first service cock, and on to the maintaining valve. Show passages 17 and 26 in gray, starting at the junction of

the rotary valve and seat.

In light green color proceed from chamber D at the left of the piston, through passage 5 including the equalizing reservoir, and passage 4 through a choke into the exhaust passage. Several light green dashes in the exhaust passage will serve to indicate flow of equalizing reservoir pressure to atmosphere. Do not confuse the encircled numbers with passage or pipe numbers.

For sketch on pressure maintaining



**A Partial Schematic, Pressure Maintaining Feature Cut Out**

1. The brake-pipe air enters the interlock cut-off valve.
2. From here it proceeds

through the interlock cut-off valve to the pilot valve spring chamber.

3. The pilot valve is in the closed position (down). This prevents communication to

the maintaining cut-off valve piston chamber.

4. Feed-valve air from passage 21 enters the spring chamber against the closed maintaining valve check valve.

On the sketch showing a partial schematic of the D-24-MC brake valve, start with yellow at passage 2b. Color this passage and the spring chamber at the right of the interlock cut-off valve. Follow passage 2a and the space under the pilot valve. The pilot valve is shown in the closed position (down). Brake pipe air cannot flow to the passage leading to the chamber over the maintaining cut-

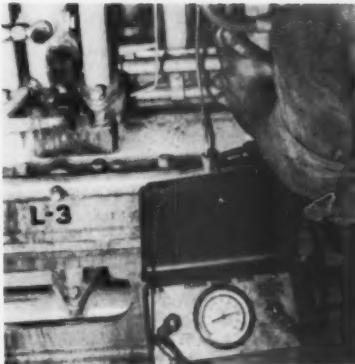
off valve piston. Therefore, the piston remains in its upward position, permitting the maintaining cut-off check valve to close.

Continue with the yellow, coloring in dashes the chamber above the piston, the passage from the chamber through the cavity in the pilot valve to atmosphere at EX. Color in orange passage 21 and the chamber below the check valve. With a

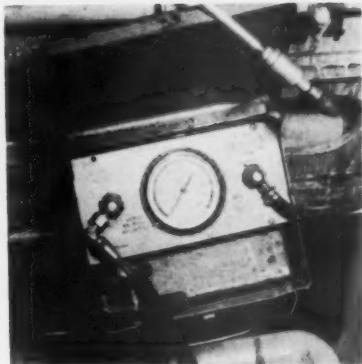
carmine pencil, follow in dashes passage 25 and the chamber at the left of the interlock cut-off valve. In each case, dampen the color with a brush and let dry before using another color. Do not color passage 14a or the chamber over the check valve at this time, assuming that the first service cock is closed. Further schematics of this valve will be shown later.

# Ideas for the Diesel Repair Man...

**PISTON FAILURES REDUCED 90%.** A reduction of 90 per cent of piston failures has been effected at the Marion, Ohio, shops of the Erie by the use of a simple instrument adopted from the automobile industry. It measures leakage past the rings in a diesel-engine cylinder and uses compressed air at any pressure from 70 to 200 psi. The instrument, known as a cylinder leakage tester and made by the Sun Electric Corporation, Chicago, measures the ratio of the incoming air pressure to pressure in the cylinder. This is a constant regardless of the applied pressure used. The gage reads 0 to 100. If no air leaks past the rings, the gage reads zero. If the rings offer no resistance to the flow of air, the reading is 100. Any reading below 70 per cent is considered satisfactory. In practice, pistons are tested once a month with the engine hot, just after shut



An actual test in progress. Since the reading was 77, the piston was removed and was found to have broken rings, tiny pieces of which had worked their way down into the



crankcase without scoring the liner. Right: The instrument out of service with the port plug nozzle hanging down over the cover of the instrument housing.

down. Each piston is tested at the top of the power stroke with the valves closed. The port plug is removed and the rubber tip of the instrument's outlet nozzle is pressed tightly into the port plug hole. Shop

air is connected to the lead-in hose of the instrument and the reading noted. If it is above 70 per cent, the piston is removed. The procedure has proved so effective that piston failures have dropped 90 per cent.

## UP TESTS FOR LEAKY CYLINDER LINERS . . . . . and Finds Them.

The Union Pacific, has recently set up a system of testing certain types of diesel cylinder liners in its Omaha shops. This system, utilizing Zygro fluorescent penetrant, with black light inspection, is said to offer substantial savings over

previous methods of testing. Corrosion and pitting on the outside of liner, particularly in the top third, could show up later as water leaks into cylinder, after engine had been entirely rebuilt. This could result in piston seizure, due to lack of



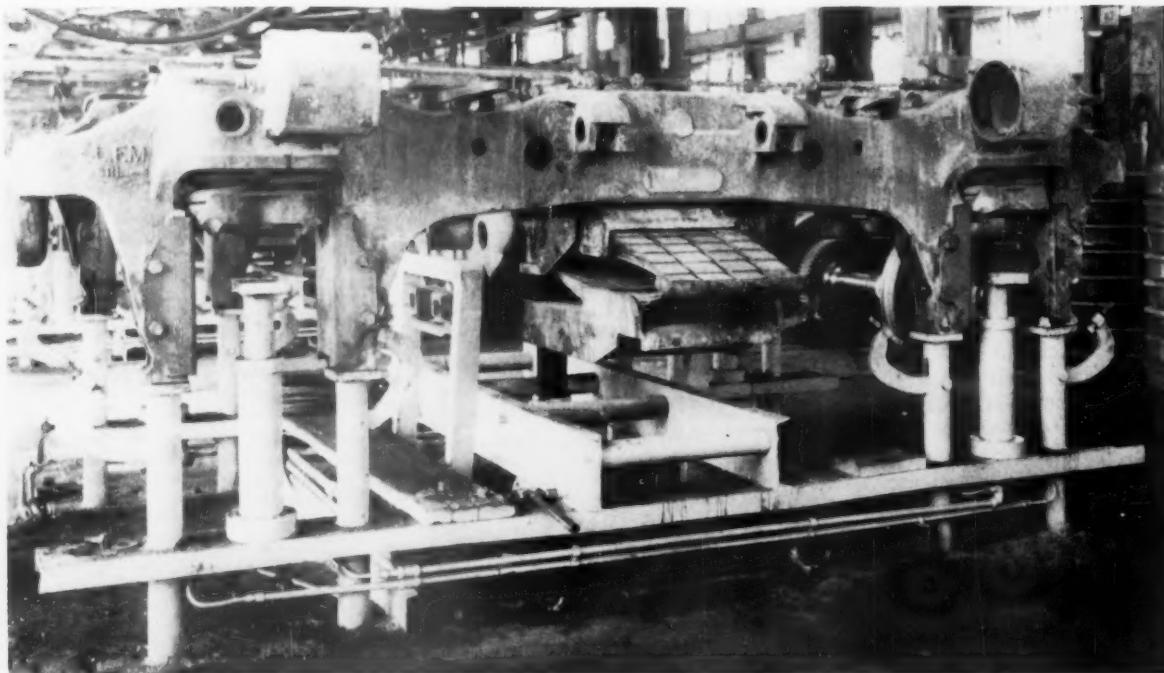
Leaky liners are detected by black light inspection.

lubrication. A container was devised to allow the liner, which is closed at the bottom with a rubber gasketed cap, to be immersed in the penetrant. After a few minutes for penetration of the solution, the inside of the liner is inspected under black light. It is reported that of 32 liners tested the first day, 7 through-leaks were discovered, as well as smaller pits, even after the entire liner had been cadmium plated. In a 60 to 90 day period, 8 to 10 liners also have been found defective.

These liners, according to the UP, almost certainly would have failed in actual operation, and a failure of this type, they assert, would require repairs of an estimated \$18,000 to \$20,000.

The UP states this new method of testing has taken the guesswork out of measurement of depth of corrosion, and to date, no liners going through this test successfully, have failed in actual service.

## Ideas for the Diesel Repair Man...



**TRUCK REPAIR STAND.** This device was developed at the Santa Fe shops, San Bernardino, Cal., to save time and labor as well as promote safety in repairing diesel locomotive trucks. It is one of three similar stands used both in dismantling and reassembling diesel power trucks. It consists of eight steel posts set in a rigid foundation and positioned to support a standard four-wheel truck on its pedestals. A stand with 12 posts supports the six-wheel trucks. Hinged clamps and hand screws can be quickly swung into place and tightened over the pedestal toes to hold the truck firmly down on the posts. Location of these posts in accordance with standard blueprint dimensions assures a square truck frame which is a good foundation on which to start rebuilding any truck.

At the center of each pair of pedestals is a cylinder and hydraulic jack which can be used to press upward on the journal box coil springs to permit removal and replacement of pedestal wear plates. Another larger hydraulic cylinder

set in the shop floor at the center of the truck stand is equipped with a piston which comes up under the center of the truck spring plank. Two tie-bars engage the truck frame over the lugs which support the traction motor suspension springs. The frame is held down while upward force on the spring plank releases pressure on the swing hanger pins, allowing them to be removed. A jib crane then holds the bolster up while the hydraulic piston is dropped. The piston carries the spring plank and elliptic springs down with it and deposits them on the four rollers which make it possible to roll these parts out from under the frame where they can be handled by an overhead crane. After this the jib crane drops the bolster on to these same ball-bearing rollers and it is also pulled out. A crane with a 700-lb hoist handles these parts.

Hydraulic pressure for this diesel locomotive truck stand is supplied by an electric-driven gear-type pump made by the Oil Gear Company of Milwaukee, Wis. It is powered by a 12-hp motor running at 1,140

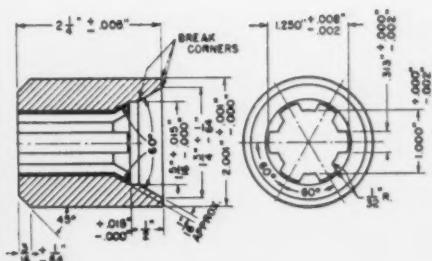
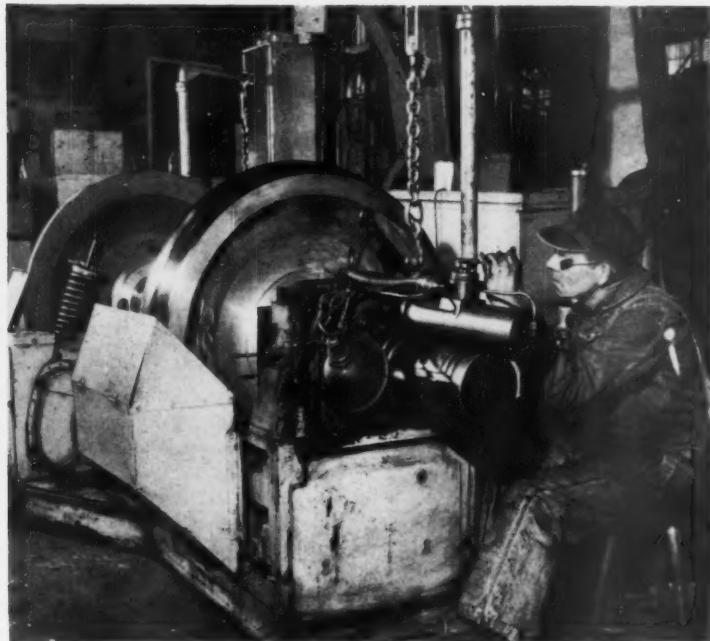
rpm and develops pressures up to 2,500 psi. A gage indicates the pressure. The development of excessive pressure is avoided by a safety by-pass valve in the equipment.

The practice is to remove the traction motors and truck wheels and then place the truck on this stand for disassembly. Foundation brake gear is removed along with the safety hangers and swing hangers. All parts are cleaned, inspected and Magnafluxed if necessary. Ex-Cell-O brake pins and bushings are checked and renewed if beyond shop wear limits. Bolster lateral wear is checked and wear plates are renewed if necessary.

Truck parts and springs are reassembled in the reverse order. Wheels are placed on an adjacent track, the repaired truck frame is lowered over them, and the pedestal tie-bars are reapplied. The truck is then ready to go back into service. On the Santa Fe, diesel locomotive passenger trucks are overhauled after about 300,000 miles of service and freight trucks after 150,000 miles.

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AXLES GET SPLINE FITTINGS . . .



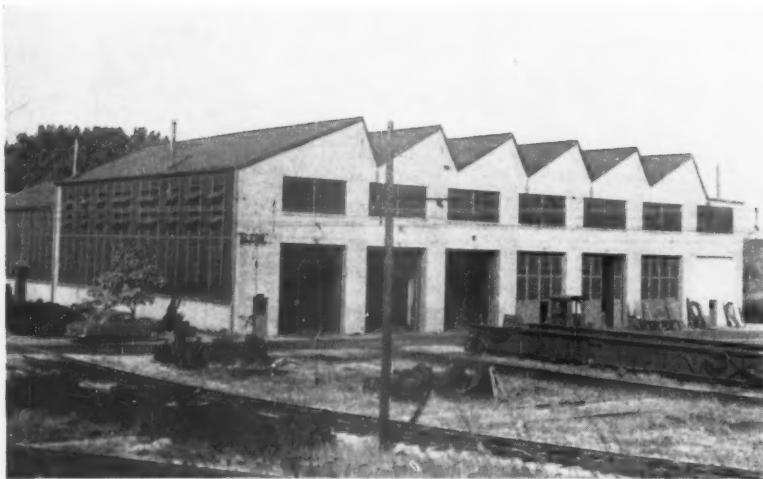
Axle end is bored for insertion (left) of the AAR standard spline fitting (above) on this machine at the Pennsy's Altoona shop. Use of this machine makes it unnecessary to remove wheels from axles—required when the work is done in a conventional lathe. Wheel set is rotated by an electrically driven rubber-tired wheel. Hydraulically-fed tools drill and bore to the exact dimension necessary for insertion of the fitting used to drive speed recorders and other control equipment.

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Baldwin cylinder liner is forced into the engine A frame with this fixture incorporating a 25-ton hydraulic jack. Fixture is fastened over two of the head studs. It was developed at the Altoona Works of the Pennsylvania.

## ELECTRICAL SECTION . . . .



The heavy repair shop. Cars and locomotives are brought in on a track lead from the right to the transfer table on which they may be spotted for any of the six tracks in the erecting shop.

**Chicago, South Shore  
and South Bend Shops  
afford many examples  
of what you can do if  
you put your mind to it**

## The Shop Behind the Railroad

CALLED "THE INTERURBAN that became a railroad", the Chicago, South Shore and South Bend remains a profitable enterprise under conditions which have eliminated

more richly endowed contemporaries. This has been accomplished by good management aided by enthusiasm, energy and much ingenuity. The manner in which these

qualities are translated into the everyday work of the mechanical and electrical departments gives tangible evidence of how the railroad has attained its success.

The railroad's policy of operation and maintenance takes cognizance of the facts that the life of electric rolling stock is inherently long, and the cost of maintenance low. This has been abetted by the purchase of locomotives discarded by other railroads and rebuilding or changing them to meet the needs of the South Shore.

The railroad has also equipped its shop by purchasing machine tools made available by other roads which have changed from steam to diesel motive power. The amount of work performed is not sufficient to justify the purchase of modern production machines. The prices paid for most of these tools were 50 per cent over scrap value.

The railroad has 77 miles of line and its rolling stock consists of 16 electric locomotives, 64 passenger



The inspection shop also houses the storehouse, air brake, paint and upholstery shops.

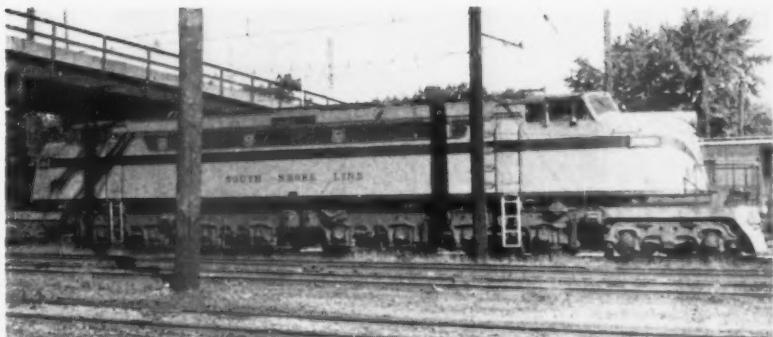
cars including 50 electric motor cars. It is electrified at 1,500 volts d-c and its cars operate over a 15-mile section of the Illinois Central suburban tracks which are also electrified at 1,500-volts d-c. Chicago, South Shore and South Bend revenues are divided almost equally between passenger and freight. The passenger operation produces practically no net income, but it is an essential part of the railroad's business.

The railroad's repair shop does all classes of mechanical work and includes a blacksmith shop and a carpenter shop. It also does all classes of electrical work, including the rewinding of not only traction motors, but all types of motors and generators used on the railroad. The shop problem is further complicated by the facts that the motive power includes three large electric locomotives built by General Electric for Russia, known as "Little Joes", four converted Type R2 New York Central locomotives, four 100-ton former Illinois Central locomotives, five 85-ton electric locomotives purchased by the South Shore between 1926 and 1930, and one 600-hp diesel electric locomotive for industrial switching. Six more of the New York Central R2's have been purchased and are available for conversion. Their addition to the South Shore pool will displace the 85- and 100-ton units.

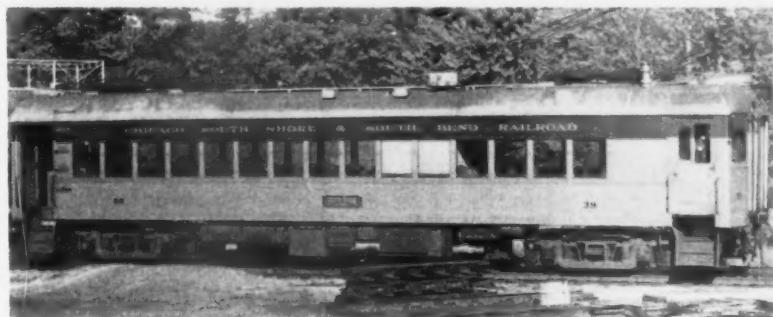
The Russian locomotives were designed for operation on 3,300-volt d-c power and the New York Central locomotives were designed for 600-volt d-c operation. Conversion, with considerable modification, seemed to be no problem for the shops.

The electric motor cars, as originally built were 60 ft long. To meet the demand of increasing passenger traffic, the cars were lengthened 17-ft 6" by adding a section in the center and increasing the number of seats from 56 to 80. At the same time, the cars were modernized by the addition of long windows and the making of other improvements, 18 were air conditioned. The shops also maintain 14 cabooses, and 75 freight cars in interchange and service.

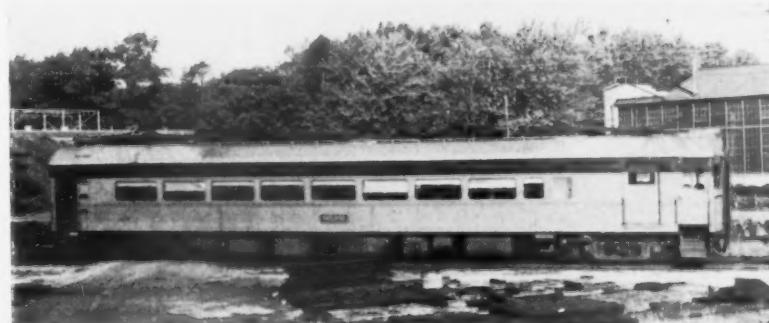
Motor cars and locomotives receive regular service inspections, and motor cars are overhauled at about 100,000 miles. Locomotives are overhauled according to service



One of the three Russian locomotives, known as Little Joes, after being converted from 3,300- to 1,500-volt operation.



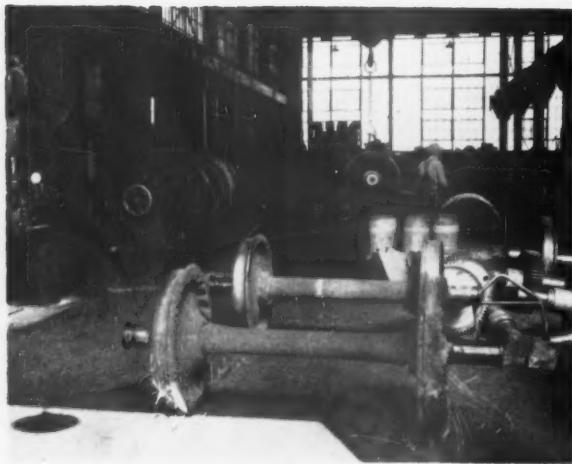
One of the electric motor cars as originally built.



One of the motor cars after being modernized and lengthened 17 ft.



The first three tracks in the erecting shop section.



The wheel and axle shop. Tools provided for this work include wheel lathe, journal lathe, wheel press and car wheel borer.



The truck shop. Work in this department is facilitated by power tools and a 10-ton crane.



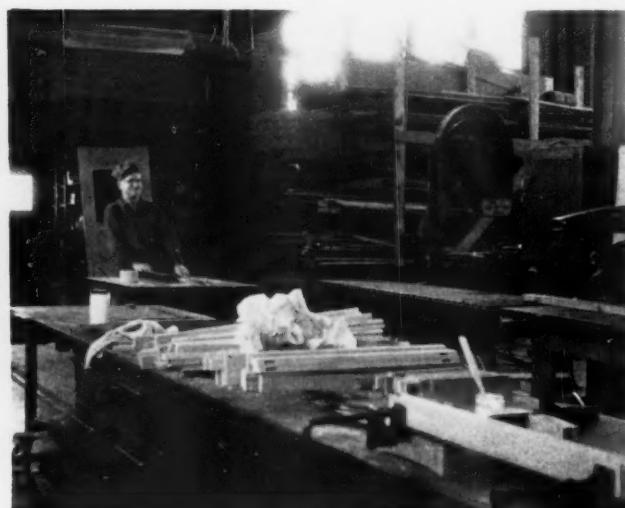
The blacksmith shop is equipped with Bradley helve hammer, hand forge, case hardening-pot, air press, welding booth and



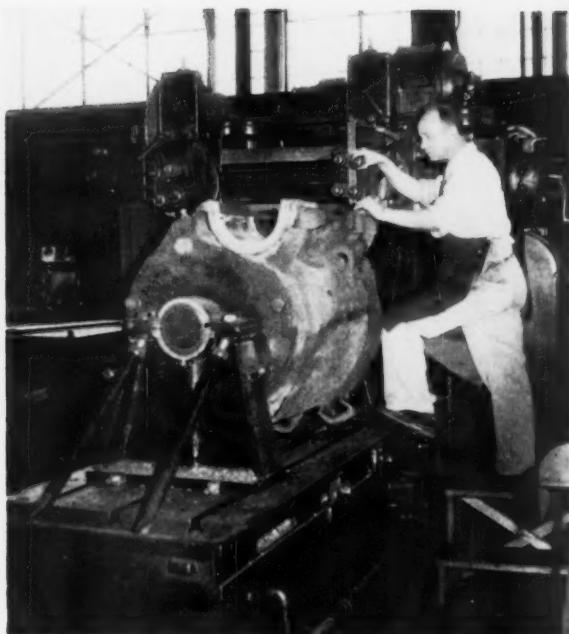
flame cutting machine. The machine shop section is equipped with lathes, boring mill, planer, turret lathe and miscellaneous small power tools.



There seems to be no limit to the variety of work done in the electric shop.



One of the important reasons for the carpenter shop is that each of the 50 electric motor cars has 12 doors.



A shop-devised jig facilitates the planing of motor axle bearing fits.



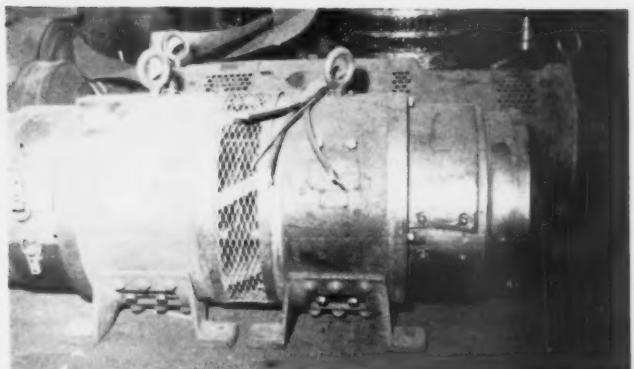
Guided by the tempiet shown in the foreground, the Oxygraph cuts out the swing hangers which are stacked behind.



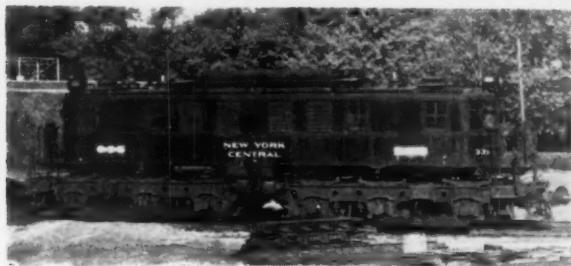
Complications of making a gear case are no handicap to the shop.



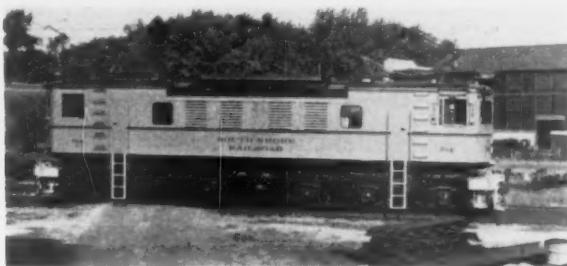
Test stand on which motor-generator sets for the motor cars are tested in their operating position. These sets are being rebuilt as shown in the following illustration.



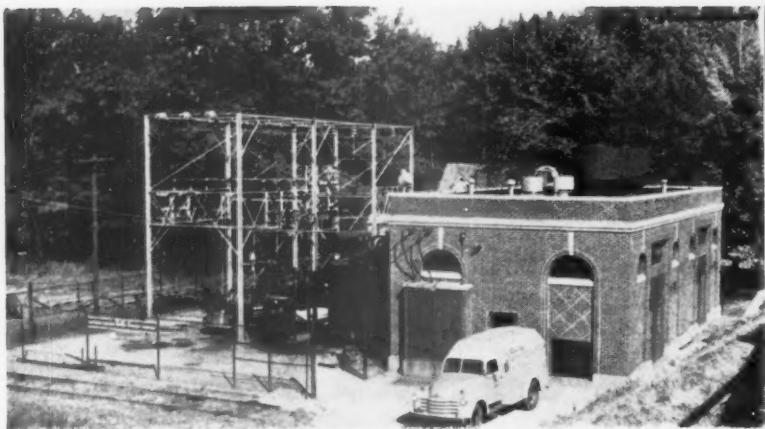
A rebuilt motor-generator set. The rebuilding has done much to correct the commutation troubles inherent in a 1,500-volt commutator and eliminate excessive vibration.



A New York Central R2 locomotive, before and after, being converted from 600- to 1,500-volt service. Cab ends were raised to



provide more room inside and to bring the pantographs to the proper height. Locomotives originally operated from third rail.



One of the sub-stations that supplies 1,500-volt d-c power for the overhead contact system.



The railroad was denied a needed extension to its shop during the war, and had to content itself with a balcony which is now used for small parts repair and is served by a dumb-waiter type of hoist.



Electrical equipment is cleaned outside the shop with benzine and a cob blast. Restored electrical equipment is dipped and baked but not vacuum impregnated.

recorded by kw-hr meters on the locomotives, and the condition of the wheels. The average mileage between overhauls will vary from 40,000 to 50,000 miles.

Located at Michigan City, Ind., there are two principal shop buildings. One of these is the inspection shop which houses 3 inspection tracks, 200 ft long, the main storehouse, air brake testing rooms and a paint and upholstery shop and a carwasher.

The other structure houses the heavy repair shop and offices, shop stores and locker and toilet facilities. The latter facilities occupy a space of 100 ft by 165 ft and the repair shop is 200 ft long by 145 ft wide. One end of the building is occupied for the most part by an erecting shop with some space given to a carpenter shop over which is a balcony used for small parts maintenance. The remaining space in the shop is divided and equipped to provide a truck shop, wheel and axle shop, blacksmith shop, machine shop and electrical shop. In addition to heavy repairs, the shop also makes all changes in equipment roster by modifying present equipment. Welding is used considerably in maintenance work, and in adapting locomotives purchased from other roads to South Shore requirements.



The paint shop section of the paint and upholstery shop in the inspection building.

# How Much Do You Know About Brushes

This is the first of a series of questions and answers on carbon brushes which will appear each month.

## Why Is Carbon Used as the Basic Material for Commutation?

THERE IS NO NEED that an atmosphere of mystery should surround the basic information pertaining to the performance of carbon brushes. It is unnecessary that railroad personnel become brush experts. This would require a long period of direct association with the production, treatment, and testing of brushes. It is possible, however, to quickly acquire an understanding which will result in savings in time, money, and delays for the railroads. In introducing this series of questions and answers, it is the author's hope that they will be of benefit to the railroad operating men, particularly the electrical group.

A brush must have certain basic properties if it is to perform its work satisfactorily. These properties may be divided into two groups. The first group consists of physical properties. The second group are the electrical properties. The sequence of arrangement has no bearing on the relative importance of a given property.

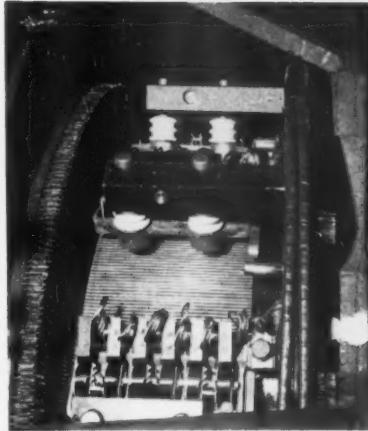
### Physical Properties

Brushes must have the following physical properties:

**STRENGTH**, sufficient to withstand the stress or mechanical shock to which a brush is subjected in service to permit the attachment of hardware or connections, and they must be non-abrasive, in the sense that the brush does not wear the commutator.

**MACHINABILITY**, to the extent that grinding, drilling, and sawing operations do not cause chipping or stresses which later result in breakage.

**LIFE**, of a level sufficient to give the user maximum service at minimum cost. This property is inseparable from the electrical property of commutation in that the utility of a brush must be judged on its performance as to life and commutation. This is discussed further under commutation.



**RESISTANCE TO OXIDATION OR BURNING.** Some materials, including some forms of carbon, oxidize more rapidly than others at low temperatures.

**INERTNESS**, in the sense that the brush must not react chemically with the commutator or brushholder under normal conditions.

**FREEDOM FROM HARMFUL BY-PRODUCTS DURING USE.** The spent material of the brush must not cause corrosive actions. It must be easily removed from the atmosphere about the commutator.

**CONTROLLED RESILIENCE**, as it affects the riding properties of a brush. The brush must also be non-brittle, in the sense that failure from mechanical fatigue does not occur.

**LOW FRICTION**, to enable the brush to ride without skipping and without destroying the commutator film layed down in commutation.

### Electrical Properties

Brushes must also have the following electrical properties:

**CONDUCTIVITY**, of sufficient level to satisfactorily conduct the highest amperage encountered in service.

**LOW CONTACT RESISTANCE**, in line with the design properties of the

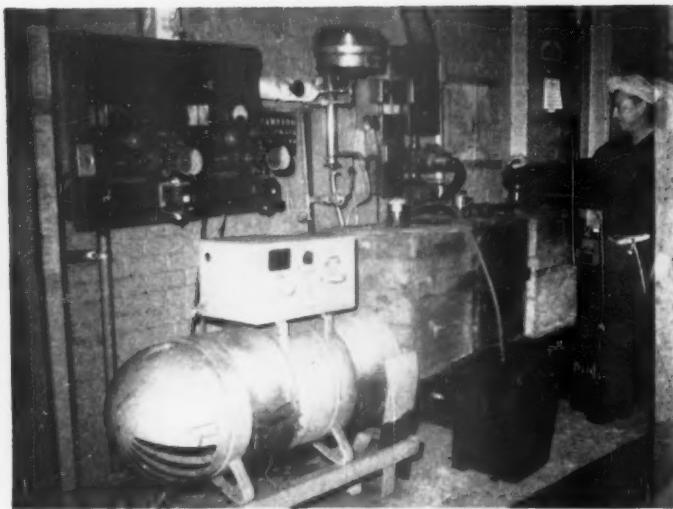
machine if excessive heat levels are to be avoided in the commutator, and burning of commutator bars is to be prevented.

**FILMING PROPERTIES**, such that, regardless of the current level passing through the brush or the rubbing speed of the commutator, a protective film remains on the commutator to prevent the brush from abrading the bars.

**COMMUTATION**—The brush must be capable of carrying the short-circuit currents, inherent in the armature coils, as their related bars pass under the brush. This must be accomplished without burning of the bars. It then follows that the brush must have sufficient range of commutating ability to handle any given voltage—current—speed relationship to which the machine may be subjected. In addition to this difficult assignment the brush must have a useful life. Longest life cannot be obtained unless the brush commutes satisfactorily. Excessive sparking and burned bars act to erode and rapidly wear away the brush. But it is only temporary economy to judge a brush solely on long life. Brushes can be produced from carbon which will wear extremely well and give fair commutation. The dream ends when the commutator shows ridging after the third or fourth set of brushes.

After consideration is given to all of the preceding properties as being required in one material, it becomes apparent that no other known basic material but carbon could be selected for brushes. The scientific methods on which the production of successful brushes is based today have developed carbon brushes far superior to the pieces of retort coke used by Mr. Van Depoele on his first electric car motors. However, the element carbon still has no superior as the best basic material for commutation.

BY K. R. MATZ  
National Carbon Company



The welding set used for battery charging and its control panel. Also shown is the water still and carboys for electrolyte. At right: the battery repair shop.



## For Long Battery Life . . . .

**Erie gets its money's worth from diesel batteries by means of cleanliness and careful attention to regulator setting**



◀ Heating cover for softening battery cover sealing compound.

Charging voltage is checked daily with a portable voltmeter. ▶



CAREFUL AND FREQUENT charging regulator adjustment and meticulous cleanliness as practiced in the Hornell Shops of the Erie, backed by a good battery shop, are paying off in good battery performance and long life. An eight-year life of battery elements is common, and additional service is another benefit obtained by battery shop care and rebuilding.

Charging generator regulators on the locomotives are checked daily. EMD regulators are set to idle at 74 volts and the throttle is then advanced to one-half or more and the voltage checked for regulation. It should not exceed 74 volts nor vary

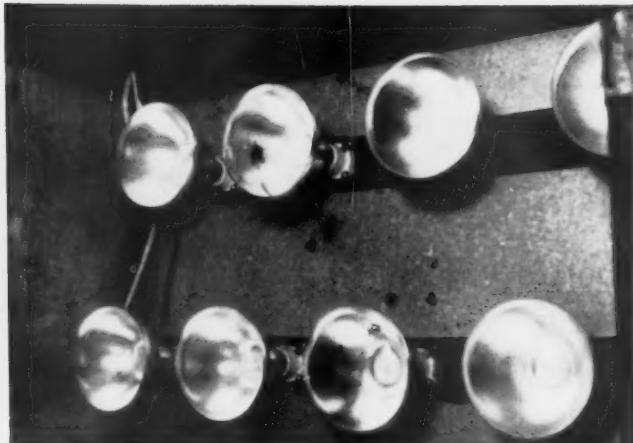
more than one volt for any steady state condition. Greater variation indicates improper regulation due to defective commutation.

Portable meters for the voltage test are made by fitting switch-board voltmeters into a plywood case. The meter panel in the case is placed diagonally between the top back and bottom front of the case to leave room inside for leads when the box is closed.

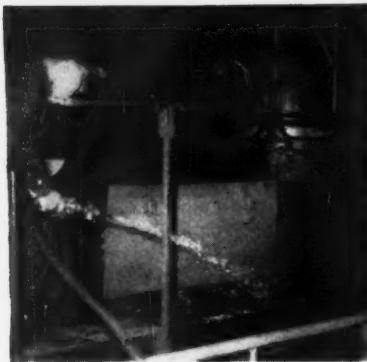
Batteries and the inside of battery boxes are washed once a month. They are first cleaned with a solution of baking soda, applied with a brush, scrubbing until all foaming stops, after which they are rinsed



A gas-fired plate is used to melt cover sealing compound. It is poured into the sealing space through snout of the coffee pot.



Eight infra-red lamps are mounted on the underside of the top panel of the heating cover.



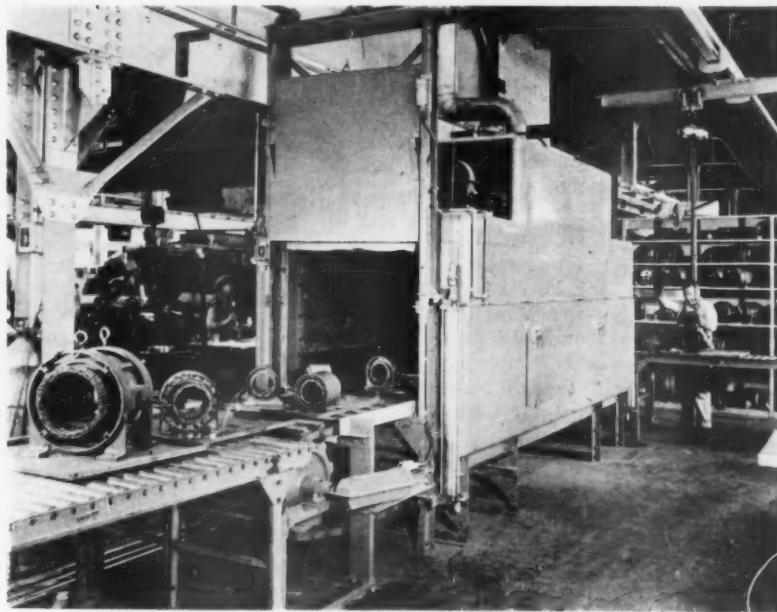
After the battery is scrubbed with soda solution, it is washed with clean water and dried with compressed air.

with clean water and dried with compressed air. Electrolyte level is checked every 2,000 miles and adjusted if necessary.

Batteries are removed from locomotives at 3-year intervals and taken into the battery shop. Here they are checked for capacity by charging and discharging at the eight-hour rate. They are kept in service without replacing elements if the capacity exceeds 75 per cent. Elements are replaced or cases renewed as necessary.

Batteries serviced at Hornell, N. Y., include those on 238 locomotives in operation from Buffalo,

N. Y., east. The work is done in a newly-built battery shop which is 15 ft wide by 60 ft long. Equipment in the shop includes a 200-amp welding machine for charging batteries, a shop-built discharge panel, one gas hot-plate for melting cover seal compound, an infra red heating cover for softening cover sealing compound in batteries, a steam-heated water still, a washing stand, a five-ton crane, work stands 18 in. high and 36 in. long, lead burning equipment, strap cutters, hand tools for removing cover compound, tray lifters and element pullers and a large vise.



**MOTOR REPAIR PRODUCTION LINE.** A semi-automated production line has cut repair time of electric motors over 50 per cent at the General Electric Company's Chicago Apparatus Service Shop. Motors up through 50 hp. can now be diagnosed, disassembled, cleaned, rewired, rebuilt, tested, and ready for delivery in 8 hours. This faster time compares with about 19 hours normally required for complete motor service. Representing the first time a motor repair production line has used a completely automatic baking oven, the integrated system has conveyor lines throughout.

## From the Diesel Maintainer's Note Book

### *Mis-Placed Fuse Causes Diesel Failure*

By Gordon Taylor

MOST DIESEL FAILURES caused by fuses involve a "blown" or failed fuse, but this tells the story of a failure caused by a good fuse. In this case, the fuse was perfectly okay. It had, with the help of some careless individual, been permitted or caused to wander away from home to a location where it caused the failure of a diesel unit.

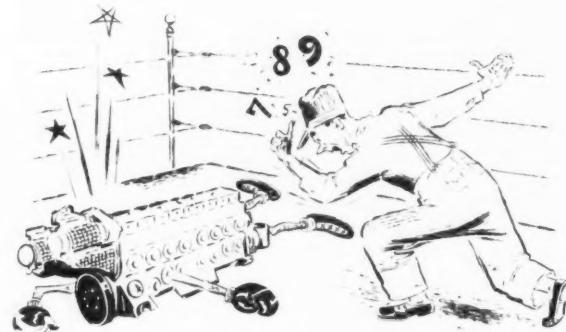
A four-unit freight diesel was dispatched from a principal terminal with all units apparently okay. Before the caboose cleared the yard, trouble appeared in the form of ground relay action.

The crew applied the usual first aid treatment of restoring the ground relay. As soon as the engine was put back on the line, another ground relay action occurred. Just as in a boxing match, when the ground relay went down for the count of three, the fireman had to count the engine out until the cause of the trouble could be found.

The locomotive, operating in level territory, managed to reach a small intermediate terminal about 30 miles late, without reducing tonnage. However, at this terminal, the train would start over a territory of heavy grades, and tonnage would have to be reduced unless the cause of ground relay action could be located and corrected.

The foreman at the small terminal was equal to the occasion. He quickly noted that the condition of the main generator commutator and brushes seemed okay. He then started looking for places where something might be grounding a power circuit.

He found that a spare 80 amp. control fuse had fallen out of its usual storage rack and landed in the bottom of the cabinet near the floor. The fuse was contacting a large power cable at one end of the fuse, with the other end against the steel



The fireman had to count the engine out!

cabinet frame. The result was continuous ground relay action.

Placing the fuse back in the spare fuse storage rack cleared up the trouble, and the diesel was back in business.

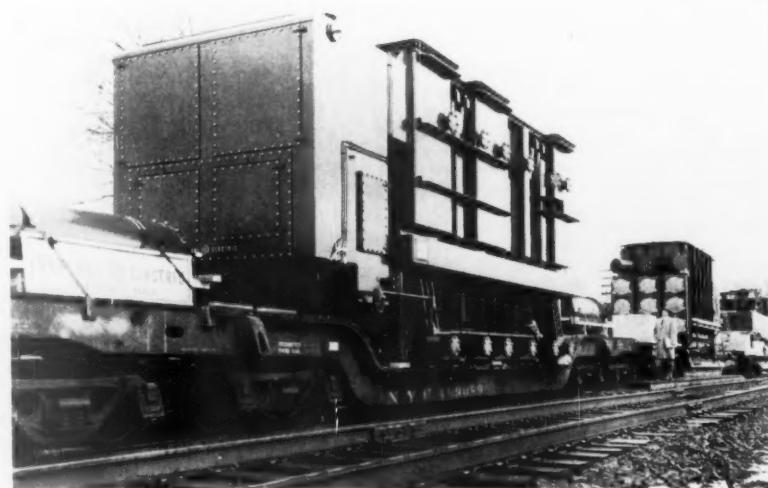
This case emphasizes the need of care in handling and storing spare fuses. The fuse had to have some help in getting to a place where it could cause trouble.

If you drop a fuse in one of these cabinets, be certain to find it, and restore it to its proper place, either

in the fuse clips or on its storage rack.

See that fuses placed on spare storage rack are properly placed in spare fuse holders, and do not slam the cabinet door on which spare fuse holders are mounted. Such rough handling may dislodge fuses and cause a failure similar to the one described here.

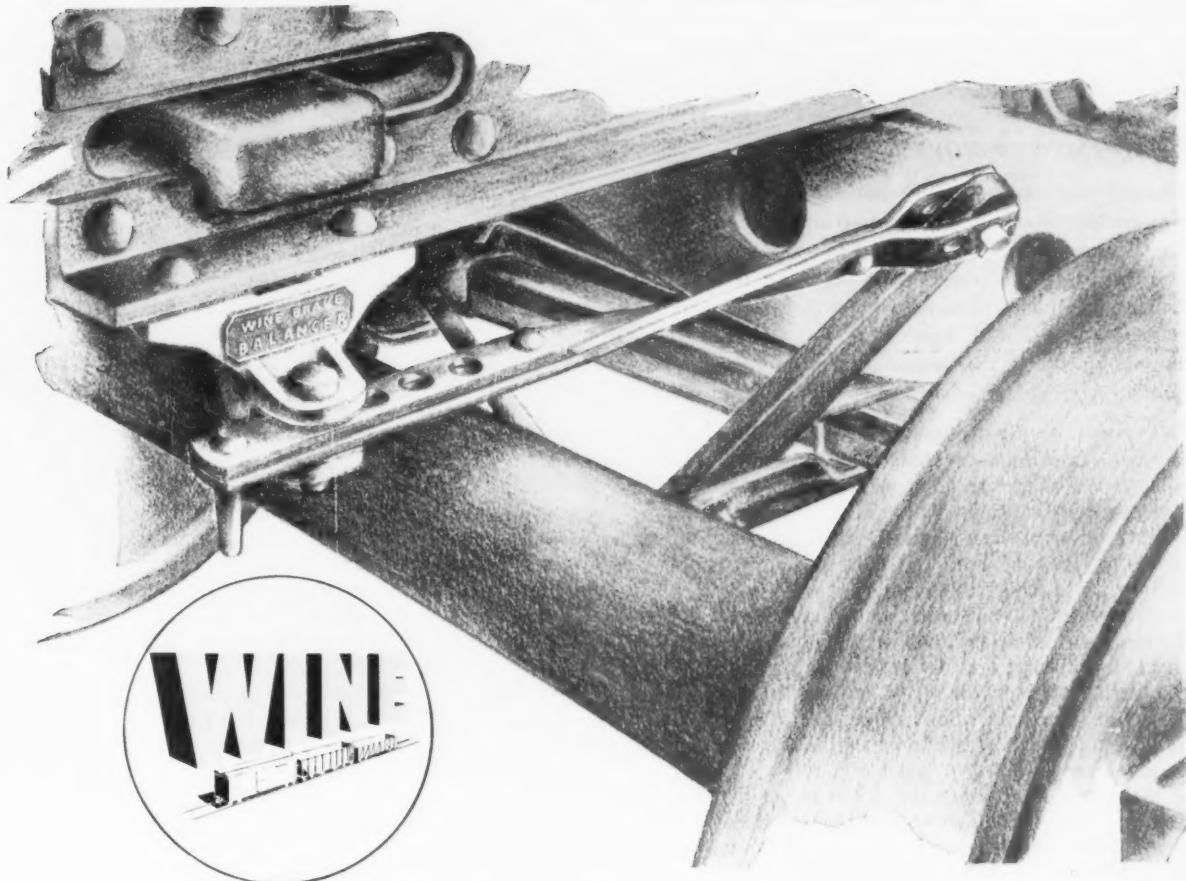
Remember, if you want to take the "Die" out of diesel, you must put more "Care" into careful maintenance.



MODIFICATION of manufacturer's design aided by the development of special service cars makes it possible to ship very large transformers by rail.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

## **EQUALIZE BRAKE FORCES..**



## **BRAKE BALANCERS**

**Eliminate truck distortion . . .  
Greatly reduce maintenance . . .**

Development of the Wine Brake Balancer has proved the solution to unbalanced braking forces that develop with the conventional truck brake arrangement.

The Wine Brake Balancer replaces the standard dead lever connector and eliminates the necessity of the dead lever connector bracket on the truck bolster.

Instead, the Wine Brake Balancer has brackets secured to the center sill flange at each end of the car, and connectors extend from these brackets to the dead levers on the truck. This arrangement "balances" the brake forces by returning them to the under-frame of the car. This simple, yet rugged design meets all service requirements on any capacity car. Write for complete details.

**THE WINE RAILWAY APPLIANCE CO., TOLEDO 9, OHIO**

# PROBLEM PAGE . . .



WHERE THE TOUGH ONES ARE HANDLED

## HANDLING FLASHOVERS

**Should the extent of a traction motor flashover determine whether it is cleaned up in place under the locomotive, or should the motor always be removed? If the practice of cleaning in place is followed, what is looked for to determine if this will be done, and how can the locomotive be moved to rotate the armature and permit inspection and cleaning of the entire commutator?**

**OUT FOR STRING BAND DAMAGE,** by *R. M. Spencer*. To say that a traction motor should always be removed after a flashover is too broad a statement to make. Some flashovers are so slight that the only evidence is some bright spots on the brush shunts. If the flashover isn't too severe, it may go until the next monthly inspection, before it is discovered.

If the wire band has been touched, remove the motor. To remove a truck and then remove the traction motor from the truck requires about three or four hours. Then the work on this motor would require additional time. Therefore, you could afford to spend three or four hours cleaning the traction motor under the locomotive, and be time ahead.

If the wire band were cut or burned or damaged in any way, then the motor should be removed, and it should come out if the commutator or the insulation has been damaged beyond quick repair. However, if upon examination, the damage appeared to be such that it could be repaired under the locomotive in a reasonable time, then I would try it.

If any work had to be done which required turning the armature, such as stoning the commutator, or cleaning the string band, then the axle should be jacked up. Welding machine leads should be attached to that particular circuit in the control cabinet in order to turn the motor.

If the cleaning of the armature required only slight infrequent moves then the axle would not have to be jacked up but the locomotive could be moved in order to move the armature.

**WORK THEM IN PLACE,** by *C. W. Martin, assistant engineer—diesel electric, Baltimore & Ohio, Baltimore.* Any maintenance shop which will remove a traction motor merely because it has flashed over must have plenty of labor and plenty of locomotives that they can hold out of service, or else they have no flashover problem at all. Unless the flashover has destroyed the string banding I would like to know why the traction motor would be removed from the locomotive.

Any damage done to the brushholder can be cor-

rected by removing the brushholder assembly and repairing it on the bench as time permits, while replacing the damaged brushholder with a repaired one. This is the practice in many railroad shops and need not delay repairs to the traction motor.

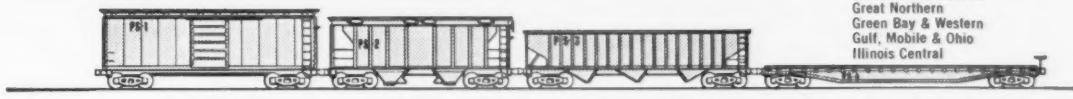
If the commutator is damaged to such an extent that it requires truing, it is possible to do this in the locomotive, and in fact this has been done in the locomotive for quite a few years on several properties. When the locomotive is equipped with roller bearings on the axle journals, it is very simple to jack up the journal box so that the wheel is lifted off of the rail and block the locomotive so that it will not move. Block appropriate line contactors so that they will not close, idle the diesel engine and furnish power to the traction motor from the diesel engine by letting the appropriate line contactor close. Two brushholders are left in the traction motor to furnish power to the commutator to cause it to rotate. The truing device is mounted in one of the brushholders and the commutator can be trued with the traction motor under the locomotive.

If rotating the traction motor by the locomotive power plant is not felt to be practical at a particular maintenance shop, the motor leads could be disconnected and the motor rotated by powering it from a welding machine. This is common practice for rotating traction motors when out from under the locomotive and on the shop floor.

Shops equipped with "drop tables" which drop single pairs of wheels and not the entire truck may find it convenient to spot the locomotive on the drop table rather than use journal jacks under the journal box.

If it is not desired to rotate the commutator for cleaning or other work as explained above there is no reason why the commutator cannot be moved around to the position required by the workmen by jacking the locomotive wheels along the rails with an ordinary car wheel jack or car mover.

Of course, if the flashover has caused the wire banding to be burned into or caused other damage which cannot be repaired without disassembling the traction motor, it is necessary to remove the motor from the locomotive. Practically any work that can be done on the traction motor without disassembling it when it is on the shop floor can also be done on the traction motor under the locomotive if it is desired to do it. It is recognized that working underneath the locomotive is a dirty, disagreeable, unhandy, miserable job and not as convenient as having the motor out on the shop floor. In many cases, working the motor underneath the locomotive will save considerable time and expense and get the locomotive back into service in much less time than changing a motor out.



**PS-1 box car, PS-2 covered hopper, PS-3 open hopper, PS-4 flat car**

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 U. S. War Department  
 Virginian  
 Wabash  
 Western Maryland  
 Western Pacific

## 6-SL Brake Equipment

This series of Questions and Answers pertains to the 6-SL air brake equipment for switching locomotives. The references to the pamphlet, page and part numbers in the text indicates where the original material may be found in the manufacturer's technical publications and instruction pamphlets. Authorized persons may obtain a copy of Instruction Pamphlet Number 5046-15 which deals with this equipment by applying to the nearest district office of the Westinghouse Air Brake Company.

**W191-Q—What does this feature constitute?**

A—The brake cylinder maintaining feature.

*Release and Recharge (Plate 1)*

**W192-Q—What must be done to release the brakes, following a brake application?**

A—The automatic brake valve handle must be moved to Running position.

**W193-Q—How does this movement affect brake pipe pressure?**

A—Air from the feed valve now flows through port 20 to cavity *r* in the rotary valve, then to ports *1a* and *1*, and then directly into the brake pipe.

**W194-Q—How is equalizing reservoir pressure affected when the brake valve handle has been placed in Running position?**

A—Air from passage *1a* also flows through cavity *j* and port *C* to chamber *D* above equalizing piston *41*, and through port *5* to the equalizing reservoir.

**W195-Q—What movement takes place at the distributing valve at this time?**

A—Feed valve air, via port *1* in the brake valve, flows to distributing valve chamber *P* increasing the pressure there above that in the equalizing slide valve (pressure) chamber.

**W196-Q—What movement then takes place?**

A—The equalizing piston moves to the left, carrying slide and graduating valves to Release position as shown on Chart 1.

**W197-Q—What is the air flow around the piston in this position?**

A—Feed groove *v*, now open, permits brake pipe air to flow into the pressure chamber until the pressures are equal.

**W198-Q—What pipe is connected to atmosphere in this position?**

A—The distributing valve release pipe.

**W199-Q—Describe the connections.**

A—Through port *4*, exhaust valve *134* of the independent brake valve, port *19*, cavity *q* in the rotary valve of the automatic portion, and port *EX*.

**W200-Q—What are the connections to the application cylinder and chamber at this time?**

A—Since cavity *k* in the equalizing slide valve connects ports *4*, *i*, *w* and *h* in the valve seat, air in application cylinder *g* and chamber will escape through the distributing valve release pipe to the atmosphere.

*Pamphlet 5046-15 (Page 40)*

**W201-Q—What action takes place as this pressure reduces?**

A—Brake cylinder pressure will move the application piston *10* to the left until the exhaust valve uncovers exhaust ports *d* and *e*, allowing brake cylinder air to escape, or in graduated release, to reduce to application cylinder pressure.

*Holding During Automatic Release (Plate 4)*

**W202-Q—How is the locomotive held applied and train brakes released?**

A—The handle of the automatic brake valve is moved to the Holding position.

**W203-Q—How do the ports now register?**

A—All ports register as in the Running position except port *19*, which is closed. Port *19* leads to the distributing valve release pipe and application cylinder.

**W204-Q—What results from this situation?**

A—Any air pressure which may be in the application cylinder from a previous application is retained there, preventing the release of air from the locomotive brake cylinders.

**W205-Q—What is the only difference between Running and Holding?**

A—In the former the locomotive brake is released; in the latter the brake is held applied.

*Emergency Position (Plate 5)*

**W206-Q—What is done to make the shortest possible stop?**

A—The automatic brake valve handle is placed in the Emergency position.

**W207-Q—What connections are made from the brake pipe in the Emergency position?**

A—The brake pipe is opened directly to the atmosphere through port *1a*, cavity *y* and the exhaust port, causing an emergency reduction of brake pipe pressure.

## Fairbanks-Morse

## Diesel-Electric Locomotives

This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

**F514-Q—What should follow?**

A—Allow plenty of time, at least ten seconds for the power contactors *P-1* and *P-2* to open and the engine speed to come down to idle.

**F515-Q—What then should be done?**

A—Selector lever should be moved to off. Reverse lever must be in forward or reverse.

**F516-Q—What takes place when selector lever is placed in off position?**

A—This action will throw the cam switch from motoring to braking position and will double traction motor blower speed through action of the pole changer which is connected mechanically to the cam switch.

**F517-Q—What must be done a few seconds after moving selector lever to off?**

A—After a few seconds, move the selector until it latches in the first braking position.

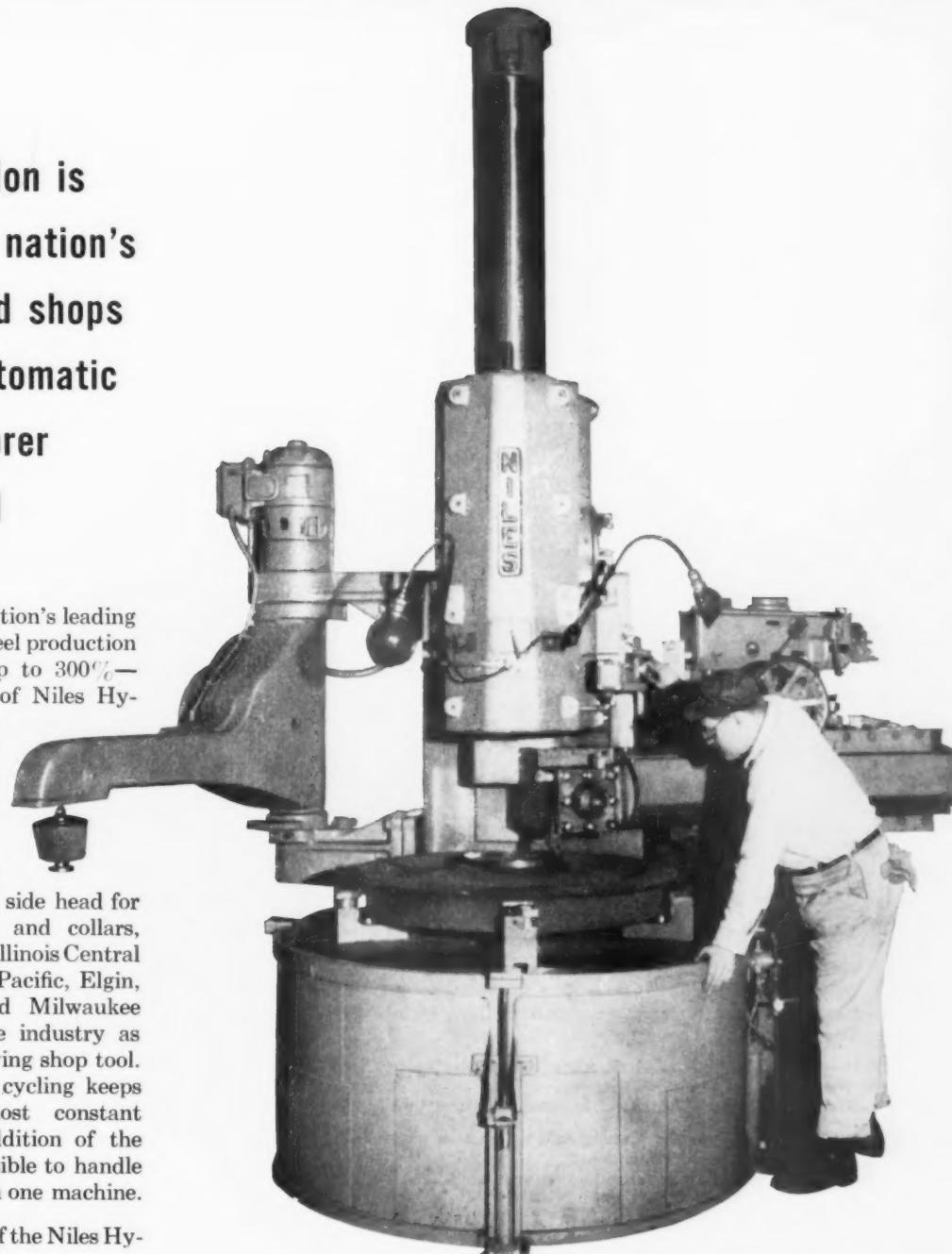
**F518-Q—What is the engine speed by this time?**

**Wheel production is  
soaring in the nation's  
leading railroad shops  
using Niles automatic  
cycle wheel borer  
with side head**

Railroad shops of the nation's leading carriers are boosting wheel production—in some instances up to 300%—thanks to installation of Niles Hydraulic Wheel Borer with side head, and to other fast, efficient Niles railroad shop tools.

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**BALDWIN · LIMA · HAMILTON**

Diesel engines • Mechanical presses • Can making machinery • Machine tools



# QUESTIONS AND ANSWERS

A—The engine speed is increased from 300 to 380 rpm. (second notch).

**F519-Q—What contactor closes and what is the result?**

A—Power contactor *P-1* closes to connect the traction motor fields to the main generator but excitation is not applied.

**F520-Q—What takes place if train speed is high?**

A—Residual magnetism in the generator and exciter fields may cause sufficient braking effort to bunch the slack.

**F521-Q—How is the braking effort indicated?**

A—The load ammeter will indicate a reading which is a measure of the braking effort being produced.

**F522-Q—What should be done after the slack is bunched?**

A—The selector lever should be moved to the right, to give the desired amount of braking.

**F523-Q—What precaution must be observed?**

A—The ammeter pointer must not be allowed to go into the red area of the braking band on the scale.

**F524-Q—Where is excitation applied?**

A—Just beyond the first braking position, when a controller contact closes the field loop contactor, *FL*.

**F525-Q—What happens on these units, if the braking grids are grounded?**

A—The ground relay will trip, on the unit affected.

**F526-Q—What should be done if the grids are wet?**

*Bulletin 1706, Sec. 110, Page 2.*

A—Amperage should be held at a minimum for a few seconds to allow the grids to dry out before proceeding to heavier braking.

**F527-Q—What is the rule on dynamic braking at 50 mph. or over?**

A—Do not apply the dynamic brake beyond the first braking position at 50 mph. or over.

**F528-Q—Why is this done?**

A—This prevents exceeding the commutation limit of the traction motors.

**F529-Q—What indication is given when the pointer enters the red area?**

A—The brake warning light is set to come on at that time.

**F530-Q—What may cause the warning light to come on while the pointer is still in the white zone?**

A—Slight differences in characteristics between units.

**F531-Q—What must be done if the light comes on?**

A—The light governs, and braking must always be reduced until the light goes out.

**F532-Q—What is the provision on some A units in the event grid current becomes excessive?**

A—A voltage relay is connected across the grid cooling fan to drop the dynamic brake.

**F533-Q—Is a warning obtained first? Explain the reason.**

A—Yes. This voltage relay is set slightly higher than the brake warning voltage relay, so that the warning is obtained first.

**F534-Q—Does the automatic brake apply on the unit when the dynamic brake is in use?**

A—No.

**F535-Q—What prevents the automatic brake from applying under such conditions?**

A—An interlock on the D-24 Control Valve of each unit performs this function.

## General Motors

### Diesel-Electric Locomotives

*This series of Questions and Answers pertains to General Motors diesel-locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.*

*Freezing Weather Precautions.  
Manual 2310, Page 223.*

**G592-Q—What must be done if locomotive is to be towed any appreciable distance in a train?**

A—The reverse switch must be locked in the *neutral* position.

**G593-Q—What must be done to effect this operation?**

A—The locking pin, which during normal operation is screwed into the left hand side of the reverser housing, must be removed.

**G594-Q—What should follow?**

A—With the reverse lever in *neutral*, the buttons on top of reverser switch should be punched lightly, to center.

**G595-Q—What must be done if control air is not available?**

A—If control air is not available, place wrench on square portion of switch shaft and center the switch manually.

**G596-Q—What must be done after the switch is centered?**

A—If control has been used, shut it off. Insert a pin into the hole in the right side of reverser housing, pushing the pin all the way through the reverser switch shaft and screw pin into threaded hole in left side of reverser housing.

**G597-Q—What must be the position of isolation switches?**

A—All the isolation switches must be in the *start* position.

**G598-Q—What must be done if it is necessary to keep the engines idling?**

A—The fuel pump and control switches should be left in the closed position.

**G599-Q—How should the air brake equipment be set?**

A—According to the air brake manufacturer's bulletin.

*Recovery of Brake after a Penalty Application.*

**G600-Q—In what position must the automatic brake valve handle be placed when attempting to recover after a penalty application?**

A—Place automatic brake valve handle in *lap* position.

**G601-Q—What should be the position of the throttle?**

A—Close the throttle to idle.

**G602-Q—What action should follow?**

A—Place foot on safety control foot pedal.

**G603-Q—What must we wait for at this time?**

A—You must wait until the application pipe pressure builds up to main reservoir pressure.

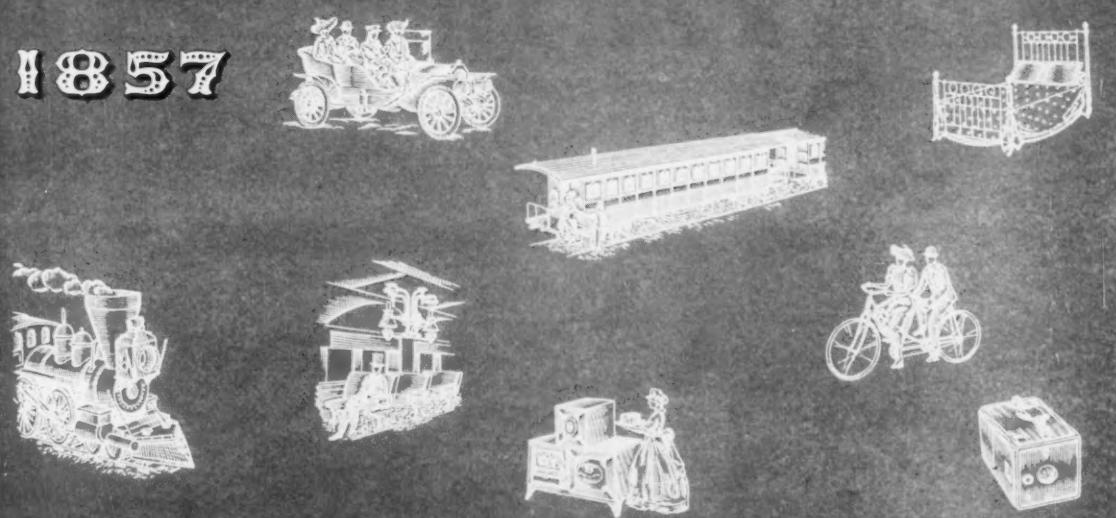
**G604-Q—In what way may the movement of application portion to release position be checked?**

A—By listening for exhaust, or watching the PCS light.

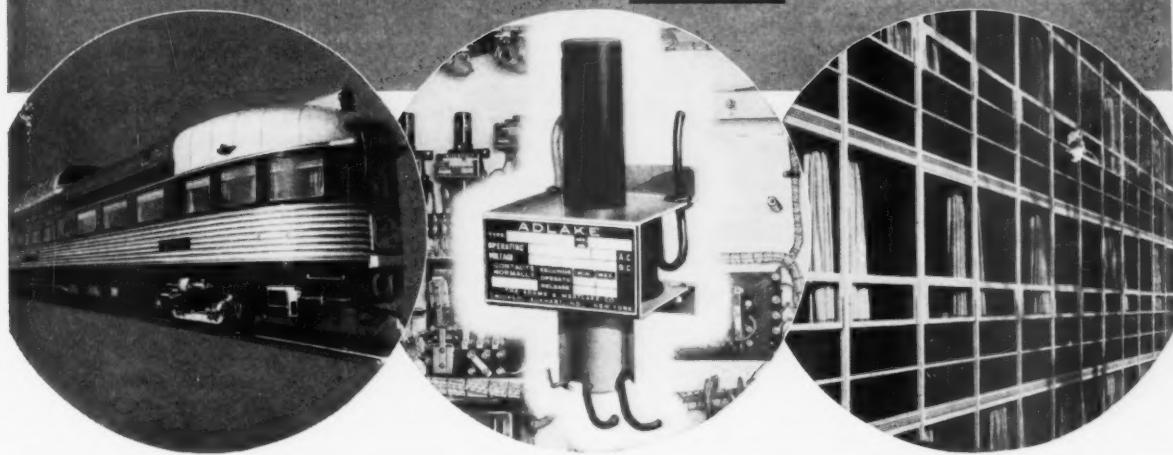
**G605-Q—What should follow?**

A—Resetting the train control. Release of the brakes.

1857



1957...and now for our second hundred years!



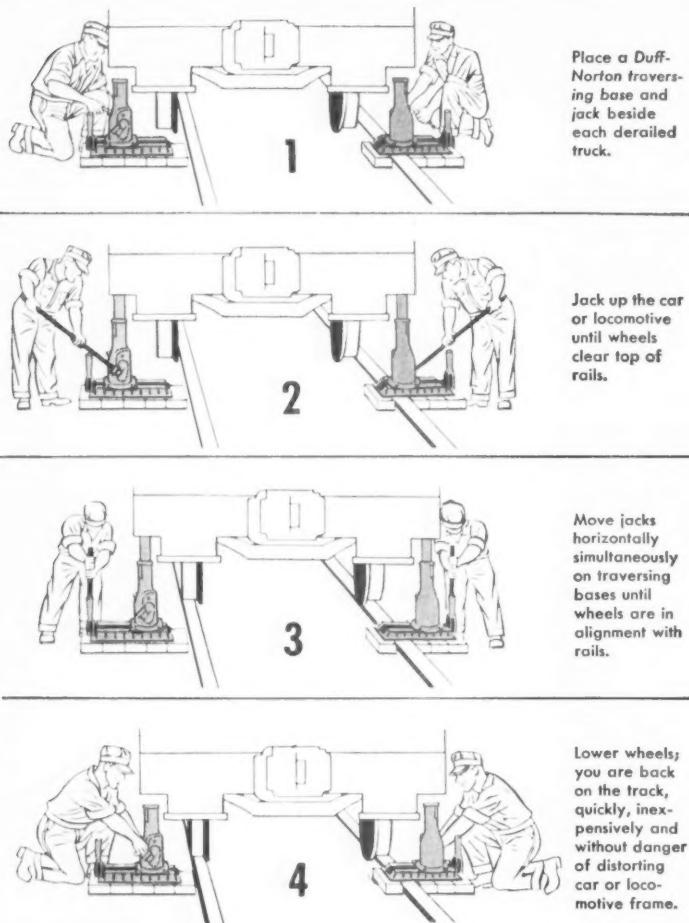
A lot of history has passed in our first hundred years. We have seen sweeping changes take place in every area of human experience. But Adams & Westlake has not changed in policy or in dedication to the maintenance of product quality.

Every Adlake product must be as excellent as our 100 years of know how can make it. This assures continuing growth for us and better products for our customers in the transportation, electronics and building construction industries.

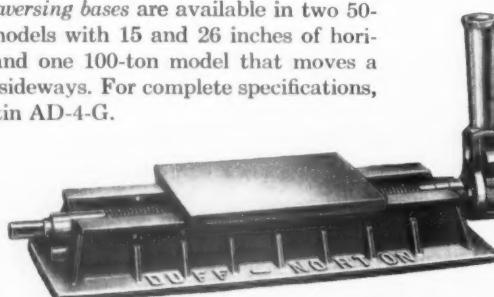


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Rachet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks,  
 Rachet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

## Personal Mention

### Atlantic Coast Line Waycross, Ga.

E. L. SPICER, shop superintendent, Ga., appointed master mechanic.

J. C. PARKER appointed shop superintendent. Formerly general foreman at Rocky Mount, N. C.

### Canadian National

R. DIXON, road foreman of engines, Montreal, appointed division master mechanic, Belleville division, Belleville, Ont.

### Chicago & North Western

A. A. ENDERS appointed general master mechanic with jurisdiction over motive power and car departments, Chicago Terminal district, Chicago.

General foreman appointments: R. G. JACOBA, Green Bay, Wis.; H. G. CRONNOBLE, Chicago Avenue Enginehouse.

H. R. SPENCER appointed master mechanic, Lake Shore-Peninsula divisions, Green Bay, Wis.

### Chicago, Milwaukee, St. Paul & Pacific

District general car foremen appointments: D. D. FISHER, Bensenville, Ill.; G. L. WOOD, Minneapolis; H. A. GROTHE, Milwaukee; J. E. PALMER, St. Paul.

J. D. O'NEILL, assistant district general car foreman at Milwaukee, appointed general car foreman at Chicago.

### Denver & Rio Grande Western Denver, Col.

J. J. SCHMIDT, electrical engineer, appointed electrical research engineer, Burnham laboratory.

P. D. STARR, superintendent diesel equipment, appointed electrical engineer.

### Erie

FRANCIS V. HUFF appointed road foreman of engines, Meadville division and B. & S.W. sub-division. Headquarters, Meadville, Pa.

### Missouri Pacific

H. B. BANEY, mechanical superintendent, Gulf district, Palestine, Tex., retired.

P. E. LATSHA, terminal master mechanic, Osawatomie terminal, Osawatomie, Kan., appointed mechanical superintendent, Gulf district, Palestine, Tex.

L. W. MARTIN, road master mechanic, Eastern, Omaha and Northern Kansas divisions, appointed terminal master mechanic, Osawatomie terminal, Osawatomie, Kan.

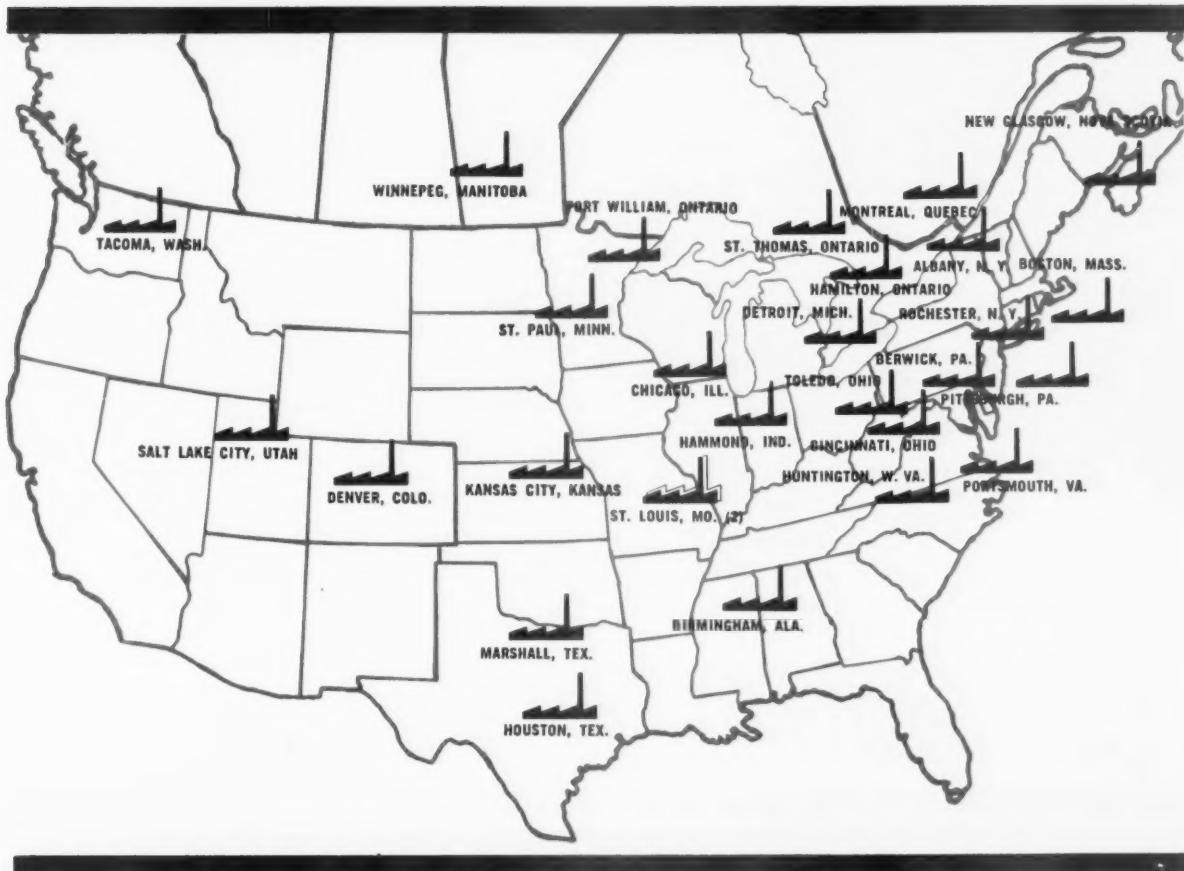
E. E. DENT, appointed road master mechanic, Eastern, Omaha and Northern Kansas divisions, Kansas City, Mo.

J. W. McCADDON appointed terminal master mechanic, Kansas City Terminal division, Kansas City, Mo.

*Sedalia, Mo.*

G. D. BALLEY, superintendent of shops, retired.

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An important fact about chilled car wheels made by Association members is that they are *accessible*. You can get fast delivery on standard, high quality wheels from the nearest of 28 plants in the United States and Canada.

Low first cost and favorable exchange rates make the Association wheel an outstanding value for freight car service. Additional economy results from the lower inventories possible with quick deliveries from a nearby plant.

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Pullman-Standard Car Mfg. Co. • Railroad Products Div., American Brake  
Shoe Co. • Canada Iron Foundries, Ltd. • Canadian Car & Foundry Co., Ltd

MP-Continued

H. M. KELLY, general car foreman, appointed superintendent of shops.

Monon

CHESTER B. GAUGH, general mechanical foreman at Bloomington, Ind., retired.

New York Central

G. M. BEISCHER, master mechanic, Collinwood, Ohio, appointed assistant mechanical superintendent, Western district, Cleveland.

J. J. GREGORY appointed assistant to general mechanical superintendent-locomotive. Headquarters, New York.

New York Central

TECHNICAL RESEARCH DEPARTMENT  
APPOINTMENTS

New York

Assistant director of technical research: W. F. COLLINS.

Collinwood, Ohio

Manager, Research Laboratory: J. A. SMITH.

Manager, Research Group: T. R. FREDRIKS.

Research engineers: H. T. ROCKWELL, R. H. WRIGHT, L. C. SIMMONS, C. H. DERNER, G. L. RUNDL.

Petroleum research engineer: W. S. BEAUREGARD.

Junior Research engineer: W. F. FRESE.

Supervisor oil test stations: R. E. O'DEA.

Cleveland

Supervisor diesel records: R. G. SAUERMAN.

Lube oil testers: J. S. ARCHER, Harmon, N. Y.; J. E. SALERNO, Syracuse.

Shop and equipment inspector: A. A. LAURIN, Syracuse, N. Y.

Richmond, Fredericksburg & Potomac

HARTWELL T. RAINY, JR., chief car inspector, Richmond, Va., appointed superintendent car department.

JAMES A. W. SMITH appointed assistant master mechanic at Potomac Yard, Alexandria, Va.

## Supply Trade Notes



J. C. Janke



J. W. Morris

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*Joseph C. Janke* has been appointed district engineer, Southwestern District, at St. Louis.

He was formerly on commercial engineering staff at Wilmerding, Pa. *John W. Morris* has been appointed representative, Southwestern district, at St. Louis.

# Lubricating Oil Analyses

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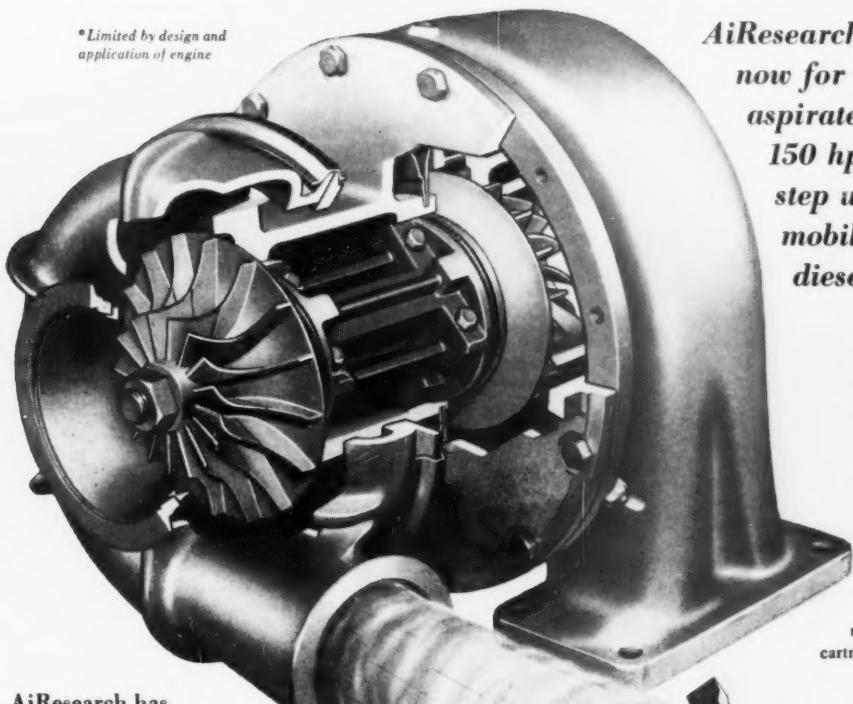
Let us help test your diesels accurately, rapidly and at surprisingly low cost. Our complete Spectrographic facilities and the world's largest Quantometer are ready to analyze your lubricating oils for any 8 metallic elements for \$4.85 per sample within the same day as sample is received. We are also equipped for viscosity tests, pentane insoluble, and neutralization value. Plastic bottles for convenient sample transmittal are supplied gratis. Contact us today to learn how we can aid your maintenance department.

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# AiResearch Turbochargers improve diesel engine performance up to 100%\*

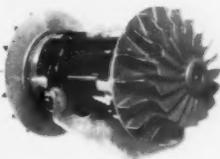
\*Limited by design and  
application of engine



AiResearch has more experience in the design and manufacture of small turbomachinery than any other company. AiResearch turbochargers are the most efficient and safest units of their kind. New additions to the AiResearch family of turbochargers have widened their range of application in the diesel engine industry.

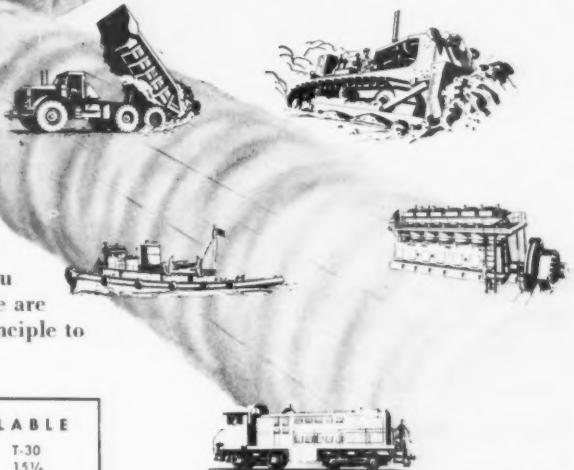
Our engineers welcome the opportunity to work with you in improving the performance of your diesel engines. We are happy to confer on applications of the turbocharger principle to your power plants.

AiResearch units are available now for use with normally aspirated diesel engines of 150 hp and up. They step up performance of both mobile and stationary diesels, land or marine.



Removable cartridge simplifies repair and overhaul

This cartridge contains the turbocharger's rotating assembly, bearings and seals in a factory balanced package. It can be replaced in minutes with another factory balanced cartridge by a mechanic on the scene.



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MODEL	T-10	T-15	T-16
Diameter — in. nom.	9	15 $\frac{1}{4}$	11 $\frac{1}{2}$
Length — in.	9	16 $\frac{3}{4}$	15 $\frac{3}{4}$
Weight — lb.	39	125	100
Output — lb/min. (Standard Conditions)	25.40	35.65	45.65
			70.95



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DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

He was previously assistant district engineer, Eastern District, at New York.

**KAISER ALUMINUM & CHEMICAL CORP.**—Kaiser has purchased the wire and cable business of *United States Rubber Company*. The purchase includes wire and cable inventories and the Bristol, R.I., insulated wire plant, for which U.S. Rubber will continue to supply rubber for wire insulation.

**EX-CELL-O CORPORATION.**—*Jack L. Mustard*, assistant sales manager of the industrial division, has been appointed sales manager of the division, at Detroit.

Ex-Cell-O has acquired the *Cadillac Gage Company* of Roseville, Mich., and the *Smith Bearing Company*, Trenton,

N.J., through exchange of stock. Both will operate as separate units under existing managements. Cadillac Gage produces a line of plug and ring gages and several special mechanisms, while Smith Bearing Company produces anti-friction needle bearings.

**McGRAW-EDISON COMPANY.**—*Thomas A. Edison, Inc.*, and *McGraw Electric Company* have merged to become the McGraw-Edison Company.

**ACME STEEL COMPANY.**—The general offices of Acme are now at 135th and Perry avenue, Chicago 27.

**STANDARD RAILWAY EQUIPMENT MANUFACTURING CO.**—The *John*

*Gillen Company*, Cicero, Ill., has been acquired by, and will be operated as a division of Standard.

**GENERAL STEEL CASTINGS CORP.**

—*W. Ashley Gray, Jr.*, has been appointed assistant to vice-president-sales at Granite City, Ill., representing western railroads. *Winthrop B. Reed*, manager, industrial sales, has been appointed manager-eastern sales, Eddy-stone, Pa.

**JOSEPH T. RYERSON & SON, INC.**—*Scott Vrooman* has been appointed sales manager at Detroit. *Bruce D. Clauson-thue* succeeds Mr. Vrooman as sales manager at Chicago.

**BULLARD COMPANY.**—*Clifford H. Hagberg*, district manager of Chicago, has been appointed assistant sales manager, and *Edward A. Sundstrom* has been appointed district manager at Chicago. Mr. Sundstrom was previously in the sales department at Philadelphia.

**THOR POWER TOOL COMPANY.**—The executive offices of Thor have been transferred from Aurora, Ill., to the Prudential Building, Chicago. *Martin A. Bertram*, a service engineer, has been appointed manager of the new Great Lakes electric tool sales zone.

**TRANE COMPANY.**—*James Whalen* has been appointed manager and *Kenneth Shannon*, assistant, in the transportation sales department. *Donald J. Girard* has been appointed manager of the sales office at Syracuse, N. Y., succeeding *James H. Hanchett*, retiring. Mr. Hanchett will continue as a sales representative in northern New York state.

**CHROMIUM CORPORATION OF AMERICA.**—*Donald H. Bissell* has been elected president, and *Charles H. Belvin* succeeds him as vice-president and secretary.

**DEVILBISS COMPANY.**—The mid-western sales area has been realigned. The company's Chicago branch will be headquarters for the north central division under *Jack E. Kennedy*, divisional sales manager. The St. Louis branch will be headquarters for the midwest sales area, under *Edward F. Luzius*, divisional sales manager. Both Mr. Kennedy and Mr. Luzius had been managers of their local branches.

**BUDD COMPANY.**—*W. L. Sheppard* has been appointed vice president and general manager of the Railway Division, in charge of all operations related to the sale and maintenance of railway passenger train car products.

**GOULD-NATIONAL BATTERIES.**—*R. W. Hopewell* has been appointed manager of field engineering for the industrial division, at Trenton, N. J.

**TIMKEN ROLLER BEARING COMPANY.**—A two-story building, containing approximately 10,000 sq ft on each

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TERRELL, TEXAS  
LOS ANGELES, CALIFORNIA\*

\*Spartan Engineering

floor, will be erected across from the main offices of Timken in Canton, Ohio. The building will house physical, railroad research, electronic, photographic and lubrication laboratories.

**RUST-OLEUM CORPORATION.**—A \$500,000 addition to the company's plant at Evanston, Ill., has recently been completed, adding 10,560 sq ft to manufacturing facilities as well as additional administrative space.

**PULLMAN-STANDARD CAR MANUFACTURING COMPANY.**—*J. W. Miller* has been appointed sales representative for Birmingham and Washington, D. C., sales office.

**NATIONAL MALLEABLE & STEEL CASTINGS COMPANY.**—*Mellor W. Stevenson* has been appointed general manager-sales, Railway Division at Cleveland. *Howard Stark* succeeds Mr. Stevenson as sales manager, Railway Division, in the St. Louis office.

**OAKITE PRODUCTS, INC.**—The following transfers have been made in the Oakite technical field service organization: *E. Lacy* from Detroit to Houston, Tex.; *R. W. Krajicek* from Billings, Mont., to Lake Charles, La.; *B. B. Herron* from Odessa to Beaumont, Tex., and *Horace V. Wells* from San Antonio to Corpus Christi, Tex. New representatives are *Robert H. Bourboullais* at Lansing, Mich.; *J. C. Ruttle* at Detroit; *Harry H. Thomas* at Cedar Rapids, Iowa; *William G. Coffee* at Birmingham, Ala.; *Andrew C. Johnston* at Washington, D.C., and *Theo L. Matula* at San Antonio, Tex.

**A. M. BYERS COMPANY.**—*B. M. Byers*, vice-president in charge of sales, has been elected president to succeed *J. Frederick Byers, Jr.*, who has been elected chairman of the board. *Ramon I. Lindberg* has been appointed director of corrosion research.

**REYNOLDS METALS COMPANY.**—*Neil W. Zundel* has been appointed manager of transportation market sales at Louisville, Ky.

**HUNT-SPILLER MANUFACTURING CORPORATION.**—*Ellis E. Walker, Jr.*, formerly assistant manager of special service, Boston & Maine, has been added to the railroad sales staff of Hunt-Spiller.

**DUFF-NORTON COMPANY.**—*T. W. Krueger*, assistant sales manager, has been appointed sales manager of the Jack Division.

**WILSON ENGINEERING COMPANY.**—*A. T. Cox, Jr.*, of Cox-McGeorge Company, Cleveland, has been appointed by Wilson as exclusive representative for railroads.

**EATON MANUFACTURING COMPANY.**—*John C. Virden*, director and member of the executive committee, has been elected president, succeeding *Howard J. McGinn*, who has held the dual positions of president and board chairman, continues as board chairman.



## Cut Down on Cleaning Time in Diesel Interiors

Cleaning engine exteriors, floors, walls need not be a time-consuming job. You can cut down on time and manpower with Magnus Diesel Magnusol.

Safe and Sure . . . Magnus Diesel Magnusol is a fast-working easily applied cleaner. Just mix the concentrated cleaner with water . . . spray it on all surfaces to be cleaned . . . After soaking for a short time, flush the cleaner and dirt away with water. Surfaces are really clean! Diesel Magnusol is harmless to paints, metals and personnel and is non-toxic and non-flammable.

For every dirty job in all railroad maintenance there is a specialized Magnus material, machine, method to speed up down time, clean more efficiently. Write for your copy of the Magnus Railroad Handbook to Magnus, 77 South Ave., Garwood, N. J.



**RAILROAD DIVISION  
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a world-wide organization specializing in cleaning and protection of all surfaces.

# *The truth about railroad*



## *Why can some manufacturers sell cleaning compounds for less than others?*

Some manufacturers are "compounders," who buy their ingredients wholesale and mix them. Others are "canners," who buy somebody else's cleaning products at an advantageous price, package them, and resell them. Neither one carries on any research of consequence. They seldom develop any new products or improve existing ones. They do not guarantee the quality or uniformity of their products. They are not in a position to give their customers service.

## *What effect does the price-per- pound of the cleaning product have on the over-all cleaning cost?*

Almost none! About 90% of the cost is labor, and

much of the rest goes for equipment, steam, etc. The amount spent for cleaning compounds is a very small fraction of your total cleaning bill.

## *Then what is the true measure of cleaning costs?*

Actual cleaning results and unit cleaning costs are what count—how much it costs you to clean a diesel, strip paint from a boxcar, clean a ton of parts or a passenger car.

## *Who can tell you if you're getting good cleaning results or not?*

Ask the men in your mechanical department who are actually responsible for the cleaning operations. They know the difference between a product made

# cleaning costs

*Here are some frank answers to some pertinent questions:*

to sell at a price and a product that is research-developed to do the job better at a lower unit cost.

## *Why can your Wyandotte representative help you get better cleaning results?*

Your Wyandotte representative has been in the railroad cleaning business a long time. He knows what

your cleaning operations *should* cost, and he is familiar with the cleaning methods and procedures that will reduce your costs to an absolute minimum. What's more, he's backed by a manufacturer that owns its own raw materials, carries on extensive research and product-development programs, and offers valuable technical service. He's been cutting cleaning costs for years. Call him in. Let him start cutting yours today. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*



**Wyandotte CHEMICALS**

J. B. FORD DIVISION

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**IDEAL**

**SHORTCUTS**  
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maintenance

QUALITY-BUILT  
TO DO THE JOB  
RIGHT!

The easiest way to restore commutators in traction motors and generators without dismantling during interim maintenance...or during periodic overhauls. IDEAL Resurfacers and other tools are used by leading railroads and recommended by locomotive builders.

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Refinish commutators to like new condition even when ridged, scored or burned. Wood block handles clamp rigidly into grinder. Seven sizes, in all grades from extra coarse to extra polish.

### MICA UNDERCUTTERS



Work easily in close quarters. Several models. Direct drive or by flexible shaft. For use with IDEAL Commutator Saws and Milling Cutters.

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Cleans and burnishes commutators. Non-dusting. Complete size range.

### CLEANER-BLOWERS

Blows air at high velocity and harmless low pressure. Lightweight and rugged. May also be used as a vacuum cleaner or sprayer. Three models:  $\frac{1}{5}$ ,  $\frac{1}{3}$  and  $1\frac{1}{3}$  H.P.

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## EQUIPMENT

(Continued from page 12)

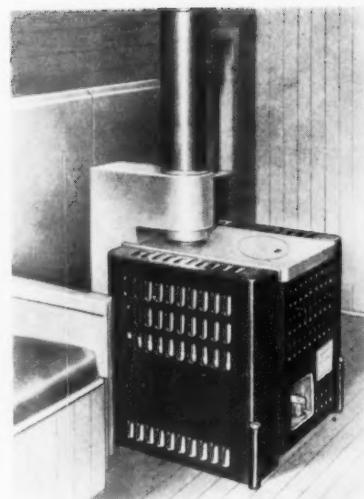
### Caboose Heater

The Vapor Caban Heater No. 55 features a special design vaporizing burner to burn regular diesel locomotive fuel oil. It will also burn No. 1 fuel oil and kerosene. The fuel control is adjustable, giving a maximum output of 55,000 BTU per hr.

The heater gives off heat, both radiant heat and convected heat. Air from the floor flows through lower openings at sides and front, and is heated by passing over the outer surfaces of the firepot. It then flows out the upper openings. A special barometric draft control is at the back.

A cast-iron surface on top of the heater is for cooking purposes. In the

(Continued on page 94)



### HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

**OIL HARDENING TOOL STEEL.** 4-page bulletin gives typical analysis, heat treatment and forging practice of Ry-Alloy oil hardening steel. This material can be supplied in rounds, squares and flats and features safe hardening, minimum distortion and good machinability. (Write: Joseph T. Ryerson & Son, Dept. RLC, Box 8000-A, Chicago 80.)

**AIR TOOLS.** 84-page catalog No. 53 contains complete descriptions and specifications of all Thor industrial air tools, including new direct drive right angle nutsetters, vertical and die grinders, etc. (Write: Thor Power Tool Company, Dept. RLC, Aurora, Ill.)

**LATHES.** 80-page catalog No. 5700 replete with illustrations, descriptive data, and specifications on engine lathes, toolroom lathes, turret lathes, vertical spindle milling machines, bench shapers, drill presses and pedestal tool grinders, attachments, tools, chucks and accessories for all South Bend machine tools also listed. Specifications include capacities, floor space requirements, etc. (Write: South Bend Lathe Works, Dept. RLC, South Bend 22, Ind.)

**FIBERGLAS.** 54-page booklet, "Fiberglas Is Working on the Railroad," illustrates, in color, broad range of thermal, acoustical and electrical insulations, fireproof fabrics, coated fabrics, and reinforcement for plastics for use in the construction and maintenance of rolling stock, buildings, fixtures and furnishings. (Write: Owens-Corning Fiberglas Corporation, Dept. RLC, Toledo 1, Ohio.)

**MARKERS.** Bulletin illustrates and describes a new permanent method of coding wire with plastic tubular markers to identify complicated thermoplastic

wiring circuits. (Write: E. C. P. Corporation, Dept. RLC, 6808 Wade Park ave., Cleveland 3.)

**STORAGE BATTERIES.** 8-page technical report, Bulletin No. 501, descriptive of Nicad sintered plate storage batteries, helps evaluate the practicability of miniature Nickel Cadmium batteries for switchgear, diesel-engine starting and portable electrical equipment. Details of development, construction and operation shown, also curves of discharge and charge characteristics. (Write: Nickel Cadmium Battery Corporation, 66 Pleasant street, Easthampton, Mass.)

**AIR HAMMERS.** 4-page catalog describes the Ramec air hammer, Model AR-4, with specifications. 4-page price list includes drawings and size data about each of more than 40 different tools and accessories available for use with the hammer. (Write: E. V. Nielsen, Inc., Dept. RLC, 129 Broad st., Stamford, Conn.)

**ARC WELDING MACHINES.** Arc welding machines for metal fabrication, construction and repair in the plant, shop and in the field described in new Airco catalog, Form ADC 708C. Specifications for each machine, from ampere ratings to outside dimensions, included. (Write: Air Reduction Sales Company, a division of Air Reduction Company, Dept. RLC, 150 East 42nd street, New York 17.)

**CHANNELCROMIUM.** 4-page Bulletin No. 74 describes Channelcromium and shows, in sequence, its application on the bore surfaces of diesel-electric locomotive engine liners. (Write: Pennington Channelcromium Company, Dept. RLC, 319 Dakota street, San Antonio 3, Tex.)

# INSIDE STORY ON BETTER SHUNT CONSTRUCTION

Thermoplastic cap protects amalgam from oxidation, prevents shunt fray-offs and pull-outs. ★

Power loss reduced to a minimum by more intimate contact between brush and connection. ↗



Minimum power loss with maximum brush life . . . less down time for maintenance . . . top performance under widely varying road conditions. You can count on all these advantages with "National" brushes because their stamped, plastic-protected shunt connection offers the lowest possible resistance to current flow.

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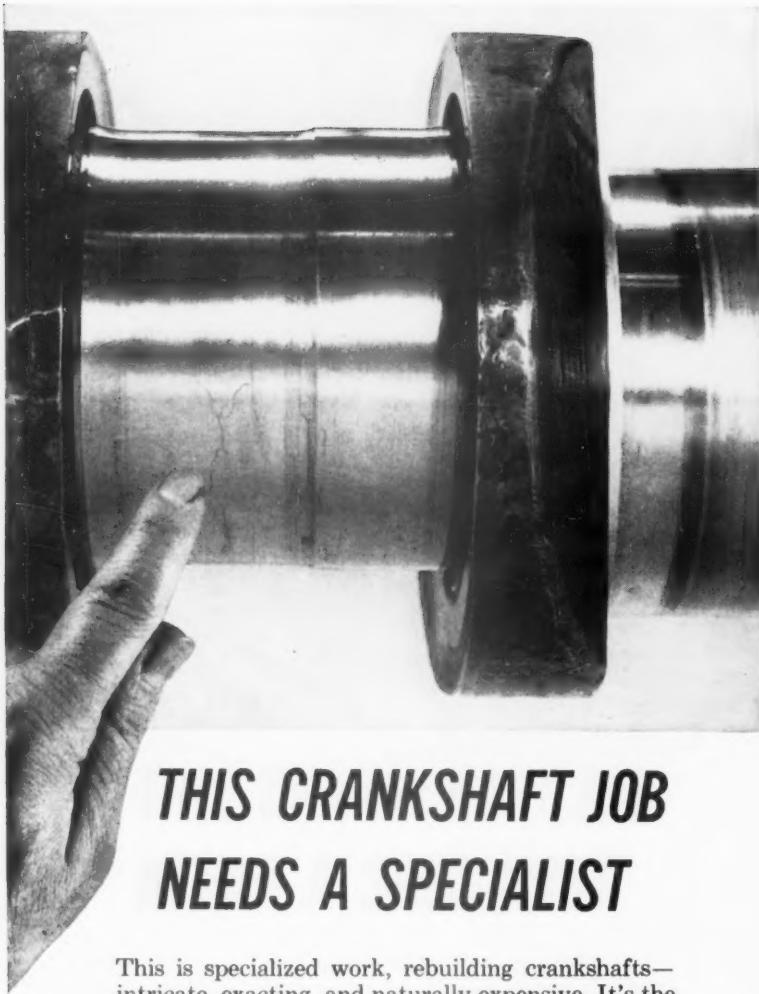
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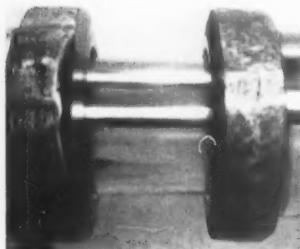


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We've specialized in rebuilding crankshafts, because since 1916 we've made crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

For more details on crankshaft repair write for Bulletin RC-1



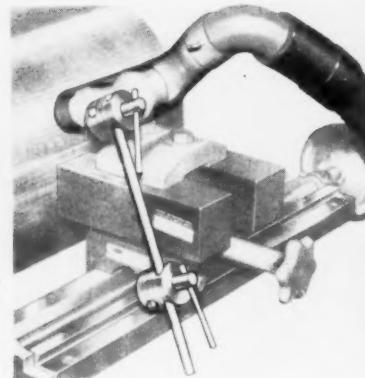
This is a finished, repaired crankshaft, after processing by National Forge.

**NATIONAL FORGE**  
AND ORDNANCE COMPANY

Irvine (Warren County), Pa.

center of this surface is a small cast-iron removable lid through which the heater can be lighted. In high mountain areas, the caboose heater can be fitted with an electric blower.

The heater is 30 in. high, 29 in. wide and 26½ in. deep, making it adaptable for use also in work cars, camp cars and small buildings. The approximate weight is 165 lb. *Vapor Heating Corporation, Dept. RLC, 80 East Jackson Blvd., Chicago 4.*



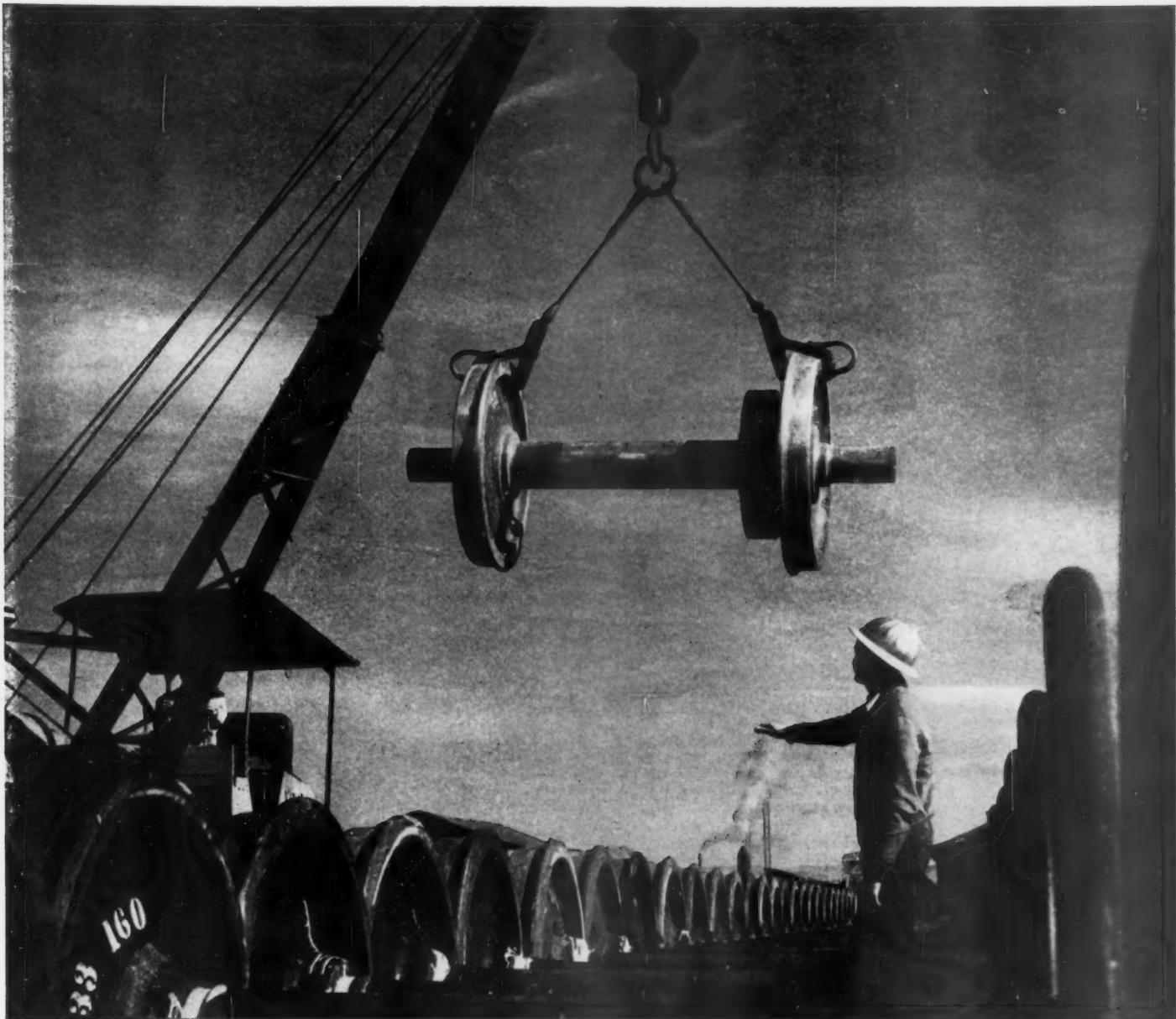
### Dustless Commutator Grinding

A vacuum dust collector which picks up the dust and metal particles made by commutator grinding is now available. It may be mounted on the grinder on the generator or motor frame, and it utilizes an industrial vacuum attachment. The unit includes an adjustable nozzle with brush and all necessary mounting brackets. The nozzle brush loosens the dust and the vacuum picks it up. Machinery clean-up time is cut to a minimum because dust is collected while the grinding job is being done. *Ideal Industries, Dept. RLC, 1563 Park ave., Sycamore, Ill.*

### Safety Detergents

Composition No. 117, a solvent detergent which with a reported safety factor, has been designed to remove grease and oil, where water cannot be used. Offered as equally effective in cleaning electrical equipment, diesel cabs, and engine compartments, with a flash point of 185 deg. this solvent has an exposure tolerance rating two and a half times greater than trichlorethylene and twenty times that of carbon tetrachloride.

Used full strength, applied by brush, immersion, or a non-atomizing spray, parts may be blown dry with compressed air. This material may be diluted with up to equal parts high flash petroleum distillate, if necessary. *Oakite Products, Inc., Dept. RLC, 146 Rector street, New York 6.*



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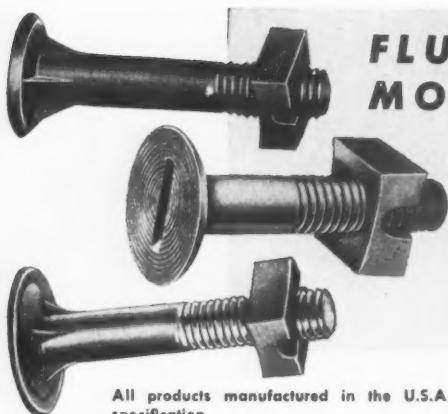
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## THE TAPER MAKES TIMKEN® THE ONLY JOURNAL BEARING THAT DELIVERS WHAT YOU EXPECT WHEN YOU BUY A ROLLER BEARING

YOU put car journals on roller bearings for only two reasons: to end the hot box problem and to cut operating and maintenance costs to a minimum. Timken® tapered roller bearings are the only bearings that do both. It's the taper. Here's why:

**1. NO LATERAL MOVEMENT WITHIN THE BEARING.** Timken bearings *roll* the load. They never slide it. There's no scuffing of rollers and races to shorten bearing life. No lateral movement to force lubricant through the seal, out of the journal box, and onto the rails to cause costly diesel locomotive wheel slip. You save the cost

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**2. POSITIVE ROLLER ALIGNMENT.** The taper in Timken bearings holds ends of rollers snug against the cone rib, where wide area contact keeps them properly aligned. There's no skewing of rollers to upset full line contact.

Unlike costly devices that merely act as "crutches" in an attempt to improve friction bearing performance, Timken bearings do away with the *cause* of hot boxes —the friction bearing itself. What's more, they bring maximum operating and main-

tenance savings. Fact is, the new heavy-duty type AP (All-Purpose) Timken journal bearing assembly will go three years without adding lubricant. Lubricant cost is cut as much as 95%. Terminal bearing inspection time is reduced 90%.

So, to end the hot box problem and slash operating and maintenance costs to the minimum, be sure you get Timken *tapered* roller bearings. The taper makes them deliver. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

**TIMKEN** TAPERED ROLLER BEARINGS ROLL THE LOAD

